N.A.A. BULLETIN

July
1959

In Two Sections
Section 1

Services of the Learning Curve

Starting Clerical Cost Control

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Significant Procedures in

Fixed Asset Detail

Stores Recording

Product Repair

Parts Pricing

Forms Control

Maintenance Jobs

N.A.A. BULLETIN

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Some Economic and Accounting Observations on the Utility of Costs for Pricing

by ROBERT G. ALLYN

A PROMINENT ECONOMIST has defined price as "the sum total of all the errors and skills which have gone into the creation of a buyer satisfaction."[1] "The ideal price is not that which represents the sellers' cost plus a 'fair' profit but that which makes the customer purchase."[2] A prominent accountant has said that "the perfect sales price is the sum of all the costs plus the profit which will yield the goal return on capital employed."[3] These statements certainly *seem* at variance.

Not Differences of Opinion But of Viewpoint

Too often, in quoting economists and accountants on what appears to be the same subject, emphasis is placed upon their disagreements rather than upon their essential agreement. The question of the effect of costs upon the setting of selling prices is an illustration of the sort of disagreement one encounters when members of the two professions elicit a comment upon a similar subject. In reality, though, the problem is not so much that of disagreement but a difference in point of view, or the vantage point from which each views the subject. This is, of course, not a unique observation and peculiar to economists and accountants. But, if we hope to achieve a basic understanding and a workable basis for reaching a common conclusion, we should continue to draw attention to these problems. In this article, therefore, I shall attempt to bridge the gap between what is implied in these two quotations and what they appear to mean on the surface. In this attempt, I shall confine my remarks to the following questions which each profession frequently asks of the other when they are met

[1] *Marketing*, Harry L. Hansen, Richard D. Irwin, Inc., 1956, p. 571.

[2] *Ibid*, p. 582.

[3] *Management Accounting for Profit Control*, I. Wayne Keller, McGraw-Hill, 1957, p. 387.

ROBERT G. ALLYN, CPA (New York and Ohio), Professor and Chairman of the Department of Accounting of the School of Business Administration of Canisius College, Buffalo, N. Y.

on the subject of costs and selling prices:

1. What does the accountant mean when he uses the term cost?
2. What are the limitations the economist has discovered or observed in the operations of the economy which tend to restrict the effect of cost upon selling price?

To paraphrase a leading accounting theorist, the "principal concern of accounting is the matching of costs and revenues periodically," the purpose being to determine the results of the interaction of "acquisition prices" and "disposition prices."[4] In effect, the accountant uses the term, "costs," to describe the prices paid to acquire the many different types of goods and services necessary for productive operations. Original cost traditionally is the basis of measurement of a firm's progress in terms of profits, rather than value. Economists, on the other hand, describe cost as the monetary expression of value, and value as the relative power of economic goods to command other goods in exchange. Initially, when an accountant records the cost of goods and services received, he is equating cost and value but only at that moment. The cost is assumed to be an expression of the value of the utilities received. Beyond this initial point of acquisition, the accountant only occasionally attempts to equate cost and value. This may be done, for instance, at the end of a period of time referred to as a fiscal period.

At such time, the results of the business operations may be reviewed and the remaining, unsold product appraised and reduced to the lower cost or market price. Customarily, this periodic appraisal is confined to the stock in trade or inventory in order to determine its marketability or current utility to a prospective buyer. Other unused goods and services, such as uncollectible accounts, capital assets, and prepaid expenses, are carried forward to the ensuing fiscal period at their original costs. This is so despite the fact that the previously-stated objective—matching costs and revenues—is no longer capable of being achieved because of the passage of time and the resulting changes in the relative values of the remaining assets. These assets will become the values of tomorrow and, therefore, no longer equal to their costs.

The Accountant—and Costs Which Are Not Values

During the time segment which is referred to as the fiscal period, accountants can pursue a number of paths, each of which is frequently calculated to lead to a different result. Nevertheless, each is considered an acceptable cost procedure.

[4] *Changing Concepts of Business Income*, American Institute of Certified Public Accountants, Macmillan, 1952, p. 28.

Looking at these procedures broadly, we find accountants viewing at the outset as classifiable into two categories:

1. Capital expenditures or costs incurred in the acquisition or production of assets having a relatively long-term utility to the firm.
2. Revenue expenditures or costs incurred in the acquisition of goods and services beneficial to the earning of revenue only during the current fiscal period.

In turn, these two categories are further classified into:

1. Product costs, or those costs considered to be an integral part of the cost of production of inventory or stock in trade.
2. Period costs, or those costs which are considered to be associated more closely with a period of time, rather than having a direct association with the product being produced during this time.

As time passes, the accountant transforms the capital expenditures into either product or period costs through the operations of a designated bookkeeping procedure. Inasmuch as record keeping is also a cost, the accountant must weigh the practical consequences of the costs of record keeping against the desire to achieve precise results through more elaborate procedures.

Within this broad framework of cost classification, the accountant has a choice of divergent accounting practices, each of which will produce a different cost for the same volume of production. The following are only a few of these accounting practices. In any discussion on costs and selling prices, they should be considered as preliminary:

1. Differences in pricing methods ranging from precise identification of component costs to some arbitrary assumption as to the flow of costs from raw material to finished product, viz., "fifo," "lifo" or "average."
2. The inclusion or exclusion of overhead as an element of product cost.
3. The inclusion or exclusion of "fixed overhead costs" in the product cost.
4. Computing depreciation on the basis of original cost, "aboriginal cost" (cost to original productive user), or replacement cost, and further adjustment to straight-line or accelerated methods.
5. Reduction of the ending inventory of unsold product to the lower of cost or market, or some point in between as recommended by the American Institute of Certified Public Accountants in *Accounting Research Bulletin Number 29.*

6. Recording and tracing the flow of costs through the bookkeeping records on the basis of actual costs, estimated costs or standard costs, and "valuing" the inventories accordingly.

7. Splitting costs between joint and by-products produced and sold, on the basis of their relative selling values or some other assumed basis.

8. Inclusion or exclusion of specific costs in the product cost as, for instance, commercial costs.

9. Inclusion or exclusion of "opportunity" and "imputed" costs in addition to costs incurred as a result of cash outlay or the assumption of a liability.

The Influence and Behavior of Demand

Let us now turn our attention to the investigations made by the economist to the problem of price determination. Over sixty years ago, Alfred Marshall wrote, "Thus we may conclude that, *as a general rule* (italics Marshall's) the shorter the period we are considering, the greater must be the share of our attention which is given to the influence of demand on value; and the longer the period, the more important will be the influence of cost of production on value."[5] Two qualifications can be observed in this statement. One is that the economist is primarily interested in formulating general rules to describe the behavior of the economy. Another is that these general rules are going to be affected by short-run and long-run influence. It is to some of these influences that I would like to refer, mainly because they are often overlooked by the accountant.

Perhaps the most influential factor affecting price is the elasticity of demand. According to the economists' textbooks demand is the quantity of an economic good which will be bought at various possible prices at a particular time. An economic good is anything that is scarce and satisfies a human want. As the accountant does not know the complete demand schedule within the narrow range of his experience with a particular firm, he can only advise the businessman that, as a result of one or two changes in price, so many more or less products were sold and so much more or less revenue earned. The point of significance, however, is that experience with the firm and observations of the industry will tell the accountant something of the nature of the demand for his firm's products in relationship to price changes. The percentage change

[5] *Principles of Economics,* Alfred Marshall, Macmillan and Co., Ltd., 8th Edition, 1920, p. 349.

in quantity sold related to a percentage change in price is referred to as the elasticity of demand.[6] With a relatively elastic demand, a given change in price produces a more than proportionate change in quantity sold. An increase in price, under these circumstances, reduces the total sales proceeds and a deduction increases them. If demand is relatively inelastic, the percentage change in quantity is less than that of price, so that reducing price will decrease sales revenues and increasing it will augment them. It is important for the accountant to be aware of these relationships as he will then be in a better position to advise management as to the effects of changes of volume upon costs and upon profits, as a result of price changes.

In a study made of the concentration of economic power published in 1941 by the Bureau of Labor Statistics for the Temporary National Economic Committee of the 76th Congress, Third Session, it was observed that, "For any individual commodity, price is but one, and not necessarily the most important, of the factors which affect its production. Thus the relatively sharp decline in the consumption of most durable goods between 1929 and 1933 was probably aggravated by the stability of their prices, but it seems likely that the postponable nature of their demand in combination with lower family incomes was of at least equal or greater importance. With the spread of unemployment and a marked curtailment of purchasing power, the sale of goods whose purchase is relatively more postponable will usually decline regardless of price; the sale of articles designed to satisfy wants which cannot be long deferred is likely to be fairly well maintained, again regardless of price.[7]" This is a practical illustration of the intricate workings of the elasticity of demand.

There are several factors affecting the elasticity of demand which the economist has called to our attention and with which accountants should reckon. Here are a few of the more important ones:

1. The extent of the knowledge and skill in bargaining possessed by the buyer. In the definition of demand cited above, it was assumed that the buyer has no unusual knowledge of the market and, therefore, cannot exert any undue influence other than his need for the commodity and his ability to pay. In the industrial markets, we know that this condition would be rare indeed.
2. Availability of substitutes. Here again is a factor at work which has greatly modified the fulfillment of the basic or general

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[6] *Managerial Economics*, Joel Dean, Prentice Hall, 1951, p. 161. Professor Dean points out that the price-output relationship is not the only relationship affecting elasticity; there is also income and promotional elasticity to be taken into account.

[7] *Price Behavior and Business Policy*, Monograph No. 1, Bureau of Labor Statistics, United States Government Printing Office, 1941, p. 51.

rule. The seemingly endless advances and innovations occasioned by the application of technology, chemistry, biology and other sciences have produced an endless stream of products, many of which are substitutes for other products.

3. The degree of product differentiation. "It is apparent, then, that brands, particularly for consumer's goods, must be considered a major aspect of non-price competition. The use of brands and trade-marks materially lessens the intensity of price competition for the products affected. This may result in a level of prices somewhat higher than would otherwise be the case. It almost certainly impairs price flexibility."[8]
4. Price leadership. The example set by a dominant leader or producer in some industries is a signal for all producers to fall in line and all raise or lower prices accordingly.

Other Factors Influencing Prices

In addition to demand elasticity, there are at least two more distinctive influences at work in the modern economy, namely,

1. The amount of capital required to "get into" an industry. The economies attendant upon mass-production restrict production to companies with substantial investments in capital assets.
2. Government protection of price rigidities through re-sale price maintenance laws.

Undoubtedly there are many more considerations to the cost-price problem, but it should suffice to say that cost, particularly in the short-run, is only one of the many factors by which a price is set. It can only be through the combined understanding of accountants, businessmen, and economists that an intelligent, profitable and socially-acceptable price can be established.

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[8] *Ibid*, p. 90.

A Work Order System Which Controls Maintenance and Repairs

by J. S. GOODMAN JR. and A. C. McMILLAN

MANAGEMENT has long recognized the need for a systematic control of repair and maintenance operations. While it is quite true that every cost system records these costs in some manner, the basic problem of systematically isolating them in an orderly and recognizable manner has hardly been explored. The trend of a rising percentage of repair and maintenance costs to total product costs, together with the necessity for over-all cost reduction makes this approach a most appropriate choice.

This paper will deal with a specific system designed for application to the Lancaster, Pennsylvania, Works of Aluminum Company of America. The Lancaster plant is a relatively small plant with limited problems of maintenance. The individual selection of costs for a particular work order, specific tools, groups of work orders, or a historical record of repair and maintenance work on a particular piece of machinery are some of the things that are obtainable from this procedure. In addition, and certainly of primary importance, it provides a much needed guide for planning the workload of the maintenance labor force. It will be recognized that a necessary adjunct to the system described is a comprehensive shop order and related coding system. Suffice it to say that such a coding job was the basic beginning to this control system.

Work Orders—Origin and Contents

The Work Order (Exhibit 1) is a four-part, carbon-interleaved set. The original, or top copy, is yellow and is used by the maintenance office as its order to perform the work. It is filed in the office until the work is completed, at which time it is dated as to when the work was finished and returned to the writer of the work order.

The second copy is a punched card which is filed in the maintenance office

---

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582273

HOURS | LABOR | NUMBER | MATERIAL | TOTAL COST | CHARGE NO. | CODE NO. | WORK ORDER NO.

WORK ORDER

CODE NO.

DEPT.	DATE ENT.	REQUESTED BY	DATE WANTED	DRAWING NUMBER	ASSET NUMBER	ACCT., LOT OR S.O. NUMBER

PERFORM FOLLOWING WORK:

CLOCK NO. DATE COMPLETED

NOTE: WHERE WORK ACTUALLY PERFORMED IS IN ADDITION TO OR DIFFERS FROM ABOVE INSTRUCTIONS WRITE IN ABOVE SPACE A BRIEF DESCRIPTION OF WORK ACTUALLY PERFORMED.

EXHIBIT 1

in the incomplete file until such time as the work is completed. Then it is placed in the finished work file, where it remains until the end of the month. Each month, the completed job cards are removed from the file and sent to the tabulating division where the costs accumulated for each job are punched and interpreted into these cards. The cards are then sorted by a code number and merged with preceding months' cards by this code number and date. The code number referred to is a two-digit number prefixed by department number and is a description of all the various types of repairs which are possible on the equipment. Up to 99 different descriptions are possible but, obviously, not this many are required.

The third copy of the work order set is green and is used as the tradesman's copy. When a job is assigned, the green copy remains with the work in order that the tradesman may correct, delete, and/or add to the incorrect or incomplete written information on the ticket. The work order number is then available to the employee. To this he assigns his labor time.

The fourth copy is pink and is retained by the writer of the work order as his record of the work he wants performed. If he requires a definite date when the work will be done, then a phone call to the maintenance office is sufficient. The writer posts this confirmed date on the work order. Writers of work orders must pay particular attention to the following items when entering orders:

1. *Department*—The department number must be placed in this block rather than the name of the department (for coding).
2. *Date entered*—This is the date on which the order is written.
3. *Requested by*—The signature of the writer of the work order is placed in this space.

4. *Date wanted*—The date on which this job should be completed is placed in this block. It is important that a realistic date be used. It is impossible for the maintenance department to plan properly unless this is done. "As soon as possible" is of no value at all, and a blank in this block indicates that there is no definite time for doing the job, which in itself is worthless, since jobs not given a completion date never seem to get done.

5. *Drawing number*—This block is filled in when a drawing number is available for maintenance parts, tools, jigs, dies, fixtures, etc.

6. *Asset number*—When a work order is written for work to be done on any equipment, the asset number of the equipment should appear in this block. If a motor is the object in point, the asset number of the motor should appear in this block and the asset number of the machine cross-referenced in the spaces assigned for the description of the work required.

7. *Account, lot or standing order number*—If the work order is to be charged to a particular production order, the production order number should appear in this block. This will generally occur in the ordering of special replacement tools and gages. If a special shop order has been authorized, then the number of the shop order should appear in this block. An example of this would be a shop order issued for new tools at the beginning of a special job. If a standing shop order number is applicable, it will appear in this block. An example of this would be normal maintenance and repair work in a department.

8. *Code number*—The code number block, immediately above the Account, lot or standing order number block, should show the code to which the work is assigned. This code may be obtained from the code sheets which follow the applicable shop order numbers in the shop order book.

9. *Part number*—For work orders for production tools, it is necessary to post the piece number of the production job at the upper left of the work order ticket just under the hours, labor, and burden blocks. This procedure enables us to obtain tool costs by part number and includes original orders for tools on special shop orders.

10. *Perform following work*—It is absolutely essential that the description be as explicit as possible on this point. It is fully realized that occasions will arise when the writer of the work order will not know exactly what has to be done and can only state "repair machine." When this does occur, it naturally is impossible to code the work, so the writer should leave the work order code block blank in these cases. This does not happen too frequently, and a sincere effort is made to give the maintenance department as much information as possible. After the tradesman has performed the work in

accordance with notes at the bottom of the work order, he writes in the work that he actually performed and any other information that seems pertinent. The maintenance office, then, from the codes in the shop order book, assigns a code to the job.

Ordering and Requisitioning Maintenance and Repair Parts

There are occasions on which maintenance and repair parts are ordered by the maintenance department and, at other times, by the writers of the work orders. In view of the new work order procedure, a slight change had to be made in the flow of the paperwork in order that the parts ordered by operating people be related to a work order number. Operating personnel who have ordered maintenance and repair parts in the past may continue to do so; however, under the new system, all records initiating the purchase requisition, purchase order, and receiving records must be referenced to include the work order number.

In order that the maintenance department may build up a record of repair and maintenance parts and their specifications, the purchasing department sends a copy of the purchase order to the maintenance department for all repair and maintenance material which has been ordered by the operating departments. The procedure followed when repair and maintenance parts are ordered by the maintenance department is very similar. It is, of course, essential that the work order number appear on all records of purchase and receipt.

The same steps apply in the case in which the operating department head is ordering material but requires no work to be done by the maintenance department. However, here, under "perform following work" the work order should state "material only."

Since it is necessary that all costs incurred on any job be assigned to that job, the work order number of the job for which the material is requisitioned must appear on the stores requisition. For repair and maintenance parts stores, requisitions are oftentimes filled out by tradesmen who then obtain the signature of the operating department supervisor. In cases such as this, the tradespeople post the work order number on the stores requisition and the person signing the requisition must check to see if this has been done.

How Maintenance Personnel Use the Work Order

One copy of the work order is given to each tradesman and states, to the best of the writer's knowledge, what needs to be done. Upon completion of the job, each tradesman is required to follow the instructions of the note across the bottom of the work order, "Where work actually performed is in addition

to or differs from above instructions, write in above space a brief description of work actually performed." This is extremely important, since our system is worthwhile only if one can determine months later just what was required on the work order. Also, when a tradesman has completed his particular function, he indicates on the work order in the assigned location, the date that the job was completed and his clock number and returns the copy to the maintenance office. At this time, if it has been necessary to change or add to the instructions of work to be performed, it is pointed out to the maintenance office that this has been done.

The new work order form has the greatest effect upon the work currently being done in the maintenance office. The duties that must be performed are:

1. Upon receipt of work order, the form is torn apart and the copies distributed as necessary. The yellow copy is the maintenance office copy and is used in planning the work through the shop. The punched card (white copy) is filed by work order number in a section titled "work to be performed." This file is relieved as the work on the order is completed. The punched work order card is then placed in a section titled "completed jobs." This file is emptied on the first of every month in order that the cards can be sent to the tabulating unit for costing.
2. The greenish-blue copy is given to the tradesman when the job is assigned and returned when the job is completed. It is the responsibility of the maintenance office to make sure that the description of the work order is complete enough when the ticket is returned to the office. If the incorrect code or no code has been assigned, then the maintenance office must assign the correct code in the code number block.
3. The maintenance office periodically checks the tradesman's time cards to make sure that the assignment of time has been correctly entered and to check the correlation between work order number and charge number. The charge number, of course, is the shop order, lot number, or special shop order.
4. Since only one job can be covered by a given code and if the maintenance department finds that two codes are necessary to describe the job, an additional work order is made out on which the proper data is written, and the time is proportioned between the two jobs.

Serviceable Compilation and Summarization

The blocks titled "hours," "labor," "burden," "material," "total cost," etc., at the extreme top of the punched cards are the locations where the tabulating

department prints the appropriate charges. The cost department accumulates costs by shop order numbers but, since this system went into effect, the work order number is also carried with the charge number. This enables the tabulating department to match work order numbers and summarize the charges for each block of the work order number and print them in the appropriate spaces. Since we have incorporated a code system into our procedures, the tabulating department now key-punches the code number into the work order tabulating card prior to summarizing charge cards for costing. The essential part of this entire system is that the proper numbers be used at all times. If this is not done, then in those cases in which improper numbers have been used, the historical file for work orders will be useless. In addition, the tabulating unit will punch the part number of the production job into the card for tools which ordinarily are repaired, made, or purchased for a specific job. In this way, tooling costs for any job over a given period of time are available.

Each month, after the tabulating unit has completed costing the tabulating work order tickets, they are sent to the engineering office where they are merged with completed work orders of the preceding months. This file is maintained in the engineering office and is available for each department's use. The location of these records in this office is thought to be of primary importance, since the maintenance and engineering units operate under the same department head.

Summary

As one example of the savings which have already been realized, one operating department has seventy-five pieces of equipment for a cold-heading process. The equipment is grouped in production centers of from one unit to fifteen units. Normal repair and maintenance expense is charged to the various production centers. For production centers with multiple units, it has been very difficult to identify the specific unit under repair or what had been done in the repairing process. The department management was sure that certain pieces of equipment were having costly experience with the clutch mechanism; however, it was impossible to prove the case with satisfaction. Since the installation of this system, it has been possible to identify the specific area of maintenance cost as the clutch mechanism, which cost had been running approximately $50 monthly on one piece of equipment. Having determined the facts, several machines were equipped with redesigned types of clutches. The resulting cost was studied to determine the longest-lasting, most-economical type. After these determinations, it was decided that, as clutches were replaced, it would be with

the redesigned types of clutches. These changes have already resulted in the saving of several hundreds of dollars.

In conclusion, this system is designed to record, for the first time, a historical data file which can be sorted to produce statistical information in a variety of ways concerning repair and maintenance cost wherever incurred. In this way, more control can be exercised, and reductions made to this important element of cost. The maintenance departmental management now has complete records of work in process, work to be scheduled, and a source of information to evaluate future requirements for maintenance labor.

Purchasing Power and the Consumer Price Index

by HAROLD W. FOX*

THERE ARE numerous accounting applications of inflation indicators (wage rates, depreciation, income evaluations, etc.). See, for example, the recent *N. A. A. Bulletin* article, "Creating Accounting Pays Its Way," by A. J. Bows, Jr. Perhaps a tabulation of certain data published by the Bureau of Labor Statistics, some of which are different from the figures given on page 43 of the February, 1959, issue of the *N. A. A. Bulletin* could serve accountants as a useful reference in their work of assisting management.

In the table on p. 18, the first field column contains the Consumer Price Index, officially called "Index of Change in Prices of Goods and Services Purchased by City Wage-Earner and Clerical-Worker Families." The second column, entitled "Purch. Power" indicates the value of the dollar corresponding to the first column. These indexes are on the basis of 1947/1949 equals 100.

For the sake of brevity, percentage-point changes are not tabulated here. Percentage points are the absolute differences between percentages or index numbers. For example, the Consumer Price Index rose 20.7 (123.5-102.8) percentage points from 1950 to 1958. This fact is not very meaningful, since a change of base years in the indexes would alter the percentage points, although the relative relationships do not change.

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* Head of management services, Rowe Manufacturing Company, Inc., Whippany.

Relative relationships are expressed in percentages. These are derived by division after the subtraction. The percentage of increase in CPI from 1950 to 1958 is 20.7 over 102.8 = 20 per cent. Column 3 shows the percentage changes in the Consumer Price Index each year.

The last column shows the annual percentage changes in measured purchasing power. Since 1950, this purchasing power of the consumer dollar has declined (97.3-81.0) divided by 97.3 = 16.8 per cent. Since 1945, there has been a 37.7 per cent decrease.

The simple average annual decline in purchasing power from the index base to 1958 is 1.9 per cent. During the past decade the year with the heaviest attrition was the one after the outbreak of the Korean conflict.

Consumer Prices and Purchasing Power of the U. S. Dollar

Indexes Published by the Bureau of Labor Statistics and Computed Annual Percentage Changes: 1945 to 1958 (1947/1949 = 100)

	Indexes		*Annual Percent Changes*		
Year	*Cons. Prices* (1)	*Purch. Power* (2)	*Cons. Prices* (3)		*Purch. Power* (4)
1945	76.9	130.0			
1946	83.4	119.9	8.5%	—	7.8%
1947	95.5	104.7	14.5%	—	12.7%
1948	102.8	97.3	7.6%	—	7.1%
1949	101.8	98.2	—1.0%		0.9%
1950	102.8	97.3	1.0%	—	0.9%
1951	111.0	90.1	8.0%	—	7.4%
1952	113.5	88.1	2.3%	—	2.2%
1953	114.4	87.4	0.8%	—	0.8%
1954	114.8	87.1	0.3%	—	0.3%
1955	114.5	87.3	—0.3%		0.2%
1956	116.2	86.1	1.5%	—	1.4%
1957	120.2	83.2	3.4%	—	3.4%
1958	123.5	81.0	2.7%	—	2.6%

The Bureau of Labor Statistics publishes the latest indicators monthly. There is no charge for a subscription. It is noteworthy that purchasing power of the business dollar for measured "All Commodities" has dropped 1.6 per cent annually (simple average) since 1947/1949. This information is available from the B. L. S. *Wholesale Price Index.*

Accounting For Customer Service Work

by FRANK R. SULLIVAN

GENERALLY SPEAKING, our company provides for the servicing of photographic equipment for a period of years which varies with type of product. Our service locations are in Rochester, New York, Atlanta, Chicago, Dallas, Los Angeles, and San Francisco. In addition, parts and service information are supplied to about 500 dealers and independent service firms who maintain facilities at a local level.

Policy and Scope in Product Servicing

It is our policy not only to make servicing available for a certain interval but also to guarantee the good operation of our products for a specified period of time after purchase. Our guarantee states that, within a year after purchase, any service required because of a defect in materials or workmanship will be made or, if it is economically impractical to do so, the product will be replaced without charge. In addition to no-charge service under this guarantee, it is necessary at times to handle work without charge for reasons of goodwill and damaged uninsured parcel postage shipments to the customer.

Since no-charge service work completed in company locations for the above reasons represents nearly 40 per cent of all customer service work, it is imperative that adequate records for accounting, quality control and, of course, corresponding purposes be kept. Such records must serve as a basis to distribute no-charge service cost to the various product lines and reflect the volume of work on the operations statement for the customer service organization. The uses of these records by quality control personnel are self-evident; however, it is noteworthy that a comparison of the defective returns to the over-all sales in units should be made periodically, so that management can be kept aware of any significant trends in these defective returns and be alerted to take action to assure a high quality of product. After accounting and quality control information is accumulated, a permanent record of the transaction must be on file for reference in writing many of the 30,000 to 35,000 letters to customers mailed over a year's time.

In establishing a price list and billing system for service work which is

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FRANK R. SULLIVAN, Rochester Chapter, 1956, is Apparatus Service Accountant, Apparatus and Optical Division, Eastman Kodak Company. He is a graduate of Boston College.

chargeable to the customer, the objectives of no-charge service work were kept in mind. Also, it is desirable to provide the customer with adequate knowledge of the nature and price of the service and to enable the paperwork to be processed in the most efficient way. By referring to the service price list, a dealer or retail customer is able to approximate the charge for the necessary work and learn what service will be given. Moreover, the dealers are aware of our policy concerning no-charge service for reasons of manufacturing defects and are able to convey this information to the customer.

Processing and Invoicing Customer Requests

As indicated later, the final decision whether or not a job should be billed on a charge or a no-charge basis is made by "editor-billers" in the customer service locations. To assist these editor-billers in preparing service invoices, a supply of tags to be attached to the equipment sent in for service is distributed at no charge to customers upon request. A service invoice is prepared for all equipment received for service whether it is on a charge or a no-charge basis to the customer. Front and rear views of the tags are shown as Exhibit 1. Despite the widespread use of these tags, some jobs are received without them but, in most of these cases, instructions in accordance with the information on the price list are enclosed.

As a result of the service price list and tag, the majority of jobs can be

REPAIR TAG
TIE THIS TAG TO ARTICLE
SEE OTHER SIDE OF CARD
Postal regulations permit writing your instructions on this tag (which should be tied to the article) if the package is marked "First-Class Mail Enclosed" and an additional three cents in stamps added to the parcel post charges. Therefore, you can give us specific instructions in the space below and, by referring to the Repair Schedule, indicate, on the reverse side of this tag, the corresponding repair classification(s). Some opportunities for misunderstanding will be avoided if you will summarize the applicable charges in the space provided.
Without specific information, we will assume that you expect to have the equipment put in working order, and to be billed in accordance with our Repair Schedule.
EASTMAN KODAK COMPANY
Apparatus Service
ARTICLE TO BE REPAIRED
YOUR INSTRUCTIONS
YOUR NAME AND ADDRESS
Front View
REPAIR TAG
TIE THIS TAG TO ARTICLE
SEE OTHER SIDE OF CARD
AMATEUR STILL CAMERAS
I FILM TRANSPORT SYSTEM
II RANGE FINDER OR REFLEX FOCUSING
III BRACES OR LENS SUPPORT
IV HOUSING WORK
V SHUTTER
VI BELLOWS
VII COMPLETE OVERHAUL
MINOR EXTERNAL REPAIR
FLASHHOLDERS
STANDARD REPAIR CHARGE
BROWNIE AND SIMPLE BOX TYPE CAMERAS
STANDARD REPAIR CHARGE
FLASHHOLDER ONLY
FLASHHOLDER AND CAMERA
MINOR EXTERNAL REPAIR
MOTION PICTURE CAMERAS AND PROJECTORS
CLASS I
CLASS II
CLASS III
MINOR EXTERNAL REPAIRS (FOR MOTION PICTURE CAMERAS)
LIMITED REPAIRS (FOR PROJECTORS)
KODASCOPE PROJECTORS AND VIEWERS
CLASS I
CLASS II
LIMITED REPAIR
APPLICABLE CHARGES
PLEASE READ THE OTHER SIDE OF THIS CARD
Rear View

EXHIBIT 1

billed accurately without mailing a price quotation to the customer. Upon receipt of a customer's job in a company service location, a receiving report bearing an invoice number is prepared, showing the customer's name and address. The next step is a review of correspondence to ascertain whether or not additional instructions were sent in separately. Before explaining how invoices are prepared, it should be pointed out that, for most service jobs, they are completed at the time of receipt of the product. The exceptions are jobs for which standard service prices have not been established. The reason for advance preparation of the invoice is not only to transmit specific service instructions to the workman but also to remind him of the labor and parts cost estimate for the particular job. Workmen realize that standard service prices have been built up from past experience and approved by the foremen.

Due to the numerous types of products serviced and the various kinds of service work involved, it has been found that the order entry operation can be accomplished more efficiently by manual means than mechanical. The steps in the preparation of the invoice, Exhibit 2, are listed below:

1. The customer's name and address are imprinted by use of a plate system. Plates have been made for each customer who forwards a significant volume of repair work to company service locations. These plates not only contain the customer's name and address but also his credit status and postal zone. In the cases of customers for whom it has been deemed unnecessary to prepare plates, the name and address are typed on the invoice and the credit status and postal zone marked by pen in the spaces provided. The use of plates has been made to avoid excessive typing costs.

2. The job accompanied by the invoice is then turned over to an editor-biller who specializes in billing the service of particular product, and a decision is made as to whether or not the job should be handled as a charge or no-charge transaction. This decision is based on the customer's correspondence and the serial number of the equipment, if any. In the case of no-charge service, the reason for the decision is marked on the shipping-work tickets, while the original copy of the invoice, without billing values, is stamped "prepaid, no charge."

3. For both charge and no-charge jobs, the remainder of the invoice is completed in the same way by the editor-biller in pen:

   a. Invoice and customer's order numbers are marked and the equipment received as indicated.

   b. The trouble is indicated under "repairs" in the lower left-hand part of the invoice. Additional instructions can be noted in the spaces provided on the shipping-work ticket only.

EASTMAN KODAK COMPANY
APPARATUS SERVICE
ROCHESTER 4, N.Y.

E 09-12-102 — SEP 17 1958

PO 29-168-F

MR JOHN SMITH
10301 EAST 200TH ST
NEW YORK 29 N.Y

CLASS: Misc. 3 — VIA IF OTHER THAN PARCEL POST — VALUE

BROWNIE CAMERAS: HOLIDAY REG. | HOLIDAY FLASH | STARFLEX | STARLET | REFLEX SYNC. | REFLEX REG. | BANTAM EYE SYNC. | BANTAM EYE REG. | TARGET SIX-20 | TARGET SIX-16

KODAK CAMERAS: DUAFLEX | DUAFLEX TEMPLE | DUAFLEX REFLEX | RETINA | RETINETTE | PONY 135C | BANTAM | 35 | SIGNET | STEREO | EXTRA | MIDGET | CHEVRON | SERIAL NO. OR CODE 101028 | LENS f/3.5

KODASCOPE: EIGHT MODEL | SIXTEEN MODEL | SOUND MODEL

CINE-KODAK: MONOPOD MOVIE MOU. | EIGHT MODEL | SIXTEEN MODEL

BROWNIE MOVIE CAMERA

SERIAL NO. | LENS | LAMP | CORD | OIL | CASE X | FLASHHOLDER

ADDITIONAL EQUIPMENT | EXTRA LAMP | REEL | SPEAKER | STRAP | FILM

MODEL

STILL CAMERAS ← REPAIRS → MOVIE CAMERAS PROJECTORS & VIEWERS			CHARGES	
X	BACK	CASE	☐ I FILM TRANSPORT SYSTEM	
	CASE	COVER COVER LOCK	☐ II RANGE FINDER OR REFLEX FOCUSING	
	BRACES	MOTOR	☐ III BRACES OR LENS SUPPORT	
	BODY RELEASE	CLAW	☒ IV HOUSING WORK	5.00
	KEY	TAKE-UP	☐ V SHUTTER	
	SHUTTER SETTING RING	FILM GUIDES	☐ VI BELLOWS	
	RANGE FINDER	FOOTAGE INDICATOR	☐ VII COMPLETE OVERHAUL	
X	VIEW FINDER	RELEASE LEVER ASSEMBLY	☐ STANDARD REPAIR CHARGE	
	FOCUS TUBE	LENS BARREL	☐ FLASHOLDER	
	SHUTTER	REPAIR FOR FILM JAMMING	☐ CLASS I	
	FLASHOLDER	CLEAN AND OIL MECHANISM	☐ CLASS II	
	BELLOWS	MECHANISM	☐ CLASS III	
	FOCUS AND CLEAN LENS	REWIND	☐ LENS WORK	
	FILM WINDING	NOISY OPERATION	☐	
	MAKE LIGHT TIGHT	SWITCH		
	REPLACE RUBY WINDOW	SOUND NOT UP TO STAN.		
	LIGHT METER	LOSS OF LOOP		
	FINDER	SLOWING LAMPS		
		REPLACE NEEDED BELTS		
		CONDENSERS		
		CHANGER ASSEMBLY		

INSURANCE
TRANSPORTATION .29
TOTAL 5.29 X

NOTE: PAY ONLY THE TOTAL MARKED X

THE CARRIER RECEIVED THIS PACKAGE IN GOOD CONDITION. IF DAMAGED, MAKE CLAIM ON CARRIER IF DELIVERED BY PRIVATE FIRM OR U.S. INSURED PARCEL POST.

AO 966

EXHIBIT 2

c. Pricing is completed on the basis of the service price list. The no-charge services are billed at net amounts and later journalized to the various product lines at the same value. It will al-

ways be more efficient to maintain this billing rule for no-charge service rather than injecting a set of adjusted net prices in the routine. It is felt that the value of no-charge service can be adjusted on an overall basis for journalizing costs to the product lines, unless the profit margins for servicing different products fluctuate significantly.

d. On the basis of predetermined postal, express and insurance costs, the total billing value on the invoice is completed. It should be noted that some jobs are not covered by standard service charges; therefore, the shipping-work ticket is marked "time-and-material," so that the job will be returned to the billing section upon completion of the necessary work.

e. The last information marked by the editor-biller is the job number on the shipping-work ticket, which enables us to tabulate sales and costs by product.

4. The receiving report is forwarded to file as a permanent record of the receipt. The equipment to be serviced along with the invoice copies, except any unused price quotation sheets which are destroyed in the order entry operation, are transported to the service units.

When a workman completes a job, he marks the invoice number, job number and time on his time card. In addition, the last two digits of his registration number (operator code) and parts usage are noted on the shipping-work ticket. For time-and-material jobs, the time spent on the service also is marked on the shipping-work ticket.

When the job is returned to the customer, the original copy of the service invoice is enclosed with the equipment, unless the customer has requested that the invoice be sent to a different address. The sales analysis copies of charge invoices are sent to the tabulating department to be incorporated in the overall company sales tabulations and later used as a basis for posting to accounts receivable records. The sales analysis copies of no-charge invoices are destroyed at this point. Lastly, shipping-work tickets are sorted and identified by type of sale-charge and the various types of no-charge transactions (defective, goodwill, etc.). From these shipping-work tickets, the type of sale, job number, sales amounts, parts usage and quantity are key-punched in tabulating cards on a daily basis. These cards are kept in the tabulating location in order to prepare periodic accounting analyses, while the shipping-work tickets are returned to the customer service organization for filing. By adhering to a daily key-punching schedule, the shipping-work tickets are readily available to correspondents for answering customer's letters.

At the end of each period (month), by using the above-mentioned tabulating cards and time cards, two reports are prepared.

SERVICE SALES ANALYSIS

Type of sales	Product line	Product	Description	Sales amount	Quantity
1	12	15200	Tourist II Kodet	$ 105.17	23
1	12	15201	Tourist II Anaston f/6.3	32.63	6
etc.	etc.	etc.	etc.	etc.	etc.
1	12	Total		$ 9,373.32	1,077
1	19	15240	Retina I	284.21	22
1	19	15241	Retina IA	293.41	24
etc.	etc.	etc.	etc.	etc.	etc.
1	19	Total		$ 4,907.59	281
etc.	etc.			etc.	etc.
1	Total			$48,697.02	6,501

NOTE - Although Sales Type 1 charge is the only one shown above, it must be be remembered that the same information for the other sales types (no-charge service for reasons of:Manufacturing Defects 2, Good-will 3, etc.) are also included.

EXHIBIT 3

Exhibit 3 serves as a basis for journalizing the net value of no-charge service for reasons of manufacturing defects to the various product lines along with goodwill service to sales expense. Also, the quantity of returns for reasons of manufacturing defects are related to sales in units in a report to management, so that any significant trends can be brought to its attention. The importance of providing such information to management was shown earlier this year when a number of returns of a particular model were serviced at no charge. Prompt action was taken to correct this situation by approval of a manufacturing change and the enclosure of more elaborate operating instructions with each piece of equipment. If such a report had not been given proper distribution, it is certain that these corrective measures would have taken longer to be put into effect.

The main use of the next report (Exhibit 4) is to adjust standard service prices. However, it also can be used to determine whether or not workmen are completing their work within the labor and material estimates from which the service prices were computed. In order to determine the performance of workmen by this method, it is necessary to maintain a control on the workers' indirect labor time.

Inasmuch as most no-charge service work is completed in company customer service sections, this article has been restricted to the processing of the paperwork in these locations. We do, however, have a routine under which author-

PROFIT OR LOSS BY PRODUCT

Product	Description	Sales	Labor	Burden	Material	Profit or Loss (CR)
15200	Tourist II Kodet	$ 2,033.10	$ 453.13	$ 1,619.54	$ 479.62	$ 80.81
15201	Tourist II Anaston f/6.3	458.27	124.89	281.00	106.00	53.62 CR
15202	Other Tourists	4,714.00	1,136.63	2,557.42	945.41	74.54
etc.	etc.	etc.	etc.	etc.	etc.	etc.
	Total year to date	$217,150.15	$48,131.76	$108,296.46	$ 55,650.08	$5,071.85

NOTE - In the preparation of this report, the value of no-charge services resulting from damaged uninsured parcel post shipments to customers is excluded, since the costs of this work are absorbed by the service organization.

EXHIBIT 4

ized independent customer service concerns can do warranty work on Eastman Kodak Company products on a local basis and charge-back this work at predetermined rates. This policy was established recently to provide faster service to customers in communities which are not situated near company service locations.

It is felt that the main advantages of this overall routine lie, not only in providing a prompt and high quality service to the customer, but also in providing the necessary accounting, quality control and corresponding information without deviating from a standard billing routine. Moreover, workmen are instructed fully as to what service should be made and foremen are able to measure, to some extent, the productivity of workmen.

Labor Cost Control Through Hiring Policy

by E. D. ZELLE*

THE TOTAL monthly labor cost of a business or organization is basically the sum of the wage and salary rates of the people in the organization. This cost will vary to a degree because of overtime, absenteeism, short work weeks, etc., but, in modern times, an organization usually has to provide a normal work week in order to retain personnel. The labor cost, then, of production and services is the payroll related to the volume of production, products or services.

While much has been written concerning work measurement, control of idleness, etc., the experience of the writer has convinced him that the possibilities of control of labor costs through hiring policies have not been given adequate consideration. In this era, much effort is being made in the area of preventive action. Forward thinking people are concerning themselves with methods to avoid problems, as being more effective in the long run than solving the problems after they appear. From this standpoint, it is submitted that the natural control point for labor costs is the hiring policy.

The following are some suggestions which should be considered in establishing a hiring policy:

1. *Remember that hiring additional employees increases the total labor cost.* We must be sure that the hiring of additional employees will increase production or revenue, or we are automatically increasing our costs and reducing our profit.
2. *Also, remember that hiring employees who do not have proper qualifications assures inefficiency.* Sometimes in a tight labor market employees are hired who do not have proper qualifications, as the qualification requirements are relaxed on the basis of expediency. While this relaxation of requirements may appear to be proper action at the time, we lose sight of the long-range effect on labor costs. The minimum effect will be an increase in training costs and temporary loss of efficiency if the employees can be brought up to proper qualifications through training. Very often, however, these people establish seniority and retain their employment

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through union contract terms and never attain the efficiency which should be expected for the position. These employees will retain their employment and prevent the hiring of properly-qualified employees at a later date. They also have an adverse effect on the morale and efficiency of other employees.

3. *Be sure that facilities are available to utilize the new employee.* The new employee cannot produce unless the tools, equipment and working space are available for him to work efficiently. The facilities for training the new employee are also important. If the employee is not properly instructed and trained in his duties, inefficiency will result, which can be overcome only by additional instruction and training.

4. *Examine the need for hiring replacements.* Most employers are understandably reluctant to take action which will cause an employee to lose his job. Therefore, when we have a requirement for replacement, it is an opportune time to examine carefully whether the replacement is necessary and whether the replacement can be made from the present personnel and so effect a reduction in labor cost.

5. *Avoid a high rate of buildup of personnel.* A high rate of buildup of personnel is dangerous for a number of reasons:

   a. Lack of facilities for training and assimilation of the new employee.

   b. Tendency toward relaxation of qualification requirements.

   c. Overestimate of future labor requirements. If the labor force is built up to a point greater than actual requirements, inefficiency results, which can be corrected only by reduction in force. There is always a lag in determining that an excess labor force exists and generally a further lag in taking corrective action.

At this point, the reader will undoubtedly be saying to himself, "Yes, this is very fine, but how can it be accomplished?". It is believed that the objectives of this approach can be achieved through the very simple procedure of a written evaluation of personnel requirements.

This evaluation could be in the form of a questionnaire. In large companies where hiring is done by a central employment group, it would become part of a personnel requisition. In small organizations where hiring is done by supervision, it could be in the form of a written memorandum to be placed in the file of the new employee. It should be understood that this evaluation is for the use and guidance of the individual determining the personnel requirements and is to be used by him as an aid rather

than as a basis for subsequent approval by higher authorities as required. The objective of this approach is to aid the supervisor in determining personnel requirements rather than as a basis for questioning his judgment. The following types of questions should be included in the evaluation:

1. *Specific justification for additional personnel.* This justification should be carefully made and the alternatives to increases in personnel should be considered. The obvious reasons for the increase, such as increased production and necessity of meeting schedules, should be further examined. These are the types of reasons with respect to which the supervisor may not have considered carefully enough whether he is fully utilizing all of the personnel presently available.

2. *The length of time the added personnel will be needed.* If the need is only temporary, it may not be advisable to hire additional people. Perhaps changes in production schedule should be made instead. It is always expensive to hire people for short periods of time.

3. *A complete description of the qualifications required of the employees to be hired.* This should include such things as typing, shorthand speed, ability to use office machines, educational background, experience, etc.

4. *Assurance that facilities are available to utilize the employee.* This should serve to pinpoint the planning of the work of the new employee.

5. *Examination of need for replacement personnel.* This should include a review of existing personnel and workload to determine whether the need for the replacement could be relieved by changes in methods or realignment of workloads.

A further check on the results of hiring policy should be made by an analysis of reasons for termination. Analysis of the reasons of terminations might well reveal clues to overhiring which could be used to advantage in the future. Analysis of both voluntary terminations and layoffs and discharges should be made, because voluntary terminations, if properly analyzed, may reveal weaknesses in personnel policy, knowledge of which would also be useful in the future, to avoid similar mistakes.

This concept of cost control is different from the usual accounting approach. The accountant should, however, recognize all effective methods of cost control.

The Need For Price-Level Depreciation Poses a Challenge to Accounting

by JOHN R. H. GILMOUR

EVER SINCE the appearance of the half-year report of The United States Steel Corporation in August of 1947, the topic of price-level depreciation, or variations, has been a "hot" topic in the professional literature. In this report, the corporation reflected an additional depreciation deduction to compensate for the loss in the excess of the value of its fixed assets over the original dollar cost.

The Committee on Accounting Procedures of the American Institute of Certified Public Accountants considered the matter and, with six dissenters, took strong exception. The corporation continued taking the extra deduction, actually giving effect to only about one-third of the calculated differential. The independent accountants, Price Waterhouse & Co., qualified their opinions and the S. E. C. required the corporation to amend its reports to the original cash basis. The ensuing controversy has waxed and waned ever since. The continued decline in the value of the dollar has led to mounting pressure upon the accounting profession to reconsider "generally accepted accounting procedures" in the area of fixed asset accounting.

First, what is depreciation? The A.I.C.P.A. Committee on Terminology states, "Depreciation accounting is a system of accounting which aims to distribute the cost or other basic value of tangible capital assets, less salvage (if any) over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner." This statement has consistently been interpreted to mean that depreciation is a method of cost allocation, rather than asset valuation or a method of financing replacements, although the phrase, "other basic value", would appear to leave the door open to further interpretation.

Then, what is price-level depreciation? The following definition is offered, "Price-level depreciation is the method of allocating the cost of fixed assets to the appropriate periods by charging each period with a portion of the historical cost of the asset, adjusted for increases or decreases in the value of

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the dollar". It should be noted that this definition of price-level depreciation takes into consideration only changes in the purchasing power of the dollar. If the resulting adjusted valuation coincides with market value, this is an effect not a cause.

Values, Profits, Viewpoints—and Depreciation

Let us, for a few moments, seek to determine why there is so much agitation in this area. Let us assume that a man having a $1,000 of capital decided to become a used car dealer. Assume further that he purchased a 1953 Ford convertible and, after several months, suceeded in disposing of it for $1,100. He decided to repeat this procedure only to discover that a replacement would cost him $1,100. Nevertheless, he repurchased a 1953 Ford convertible and subsequently disposed of it for $1,200 whereupon he repurchased another at this price. As a result of these transactions, he is now carrying an inventory of $1,200 and his books reflect a profit of $200, whereas the facts are that he has substantially the same item he started with. Furthermore, he is now liable for a tax on $200 of profit, a profit which he could in good conscience stoutly maintain he never enjoyed. This is an example of the distortion of reported net income introduced into the accounts by a rapid rise in price levels. "Lifo" has now become a generally accepted accounting procedure designed to cope with this very real problem as it relates to inventories. It is acknowledged to be a valid attempt to match current cost and current revenues.

With reference to fixed asset depreciation, it has long been maintained that traditional accounting procedures based upon cost result in the matching of successively older dollars against current revenues and that as a consequence much of the net income reflected in reports to the stockholders is in fact phantom profit. This has been estimated to be a considerable portion of all profits. The situation seems to demand a comparable remedy.

It might be well at this point to raise the question, "What is the purpose of recording depreciation in the books of account?" We have already referred to the viewpoint of the A.I.C.P.A. Committee on Terminology. A study reported by R. G. James, in the May 1954 issue of the *Bulletin* sampled the opinion of 52 business executives. The answers were as follows:

Depreciation recovers—

Historical cost	4	Change in value	7
Productive capacity	21	Real investment	13
Competitive capacity	7		52

Note that only four individuals accepted the recovery-of-historical-cost concept—

and all four were accountants or controllers. The remainder are giving expressions to variations of price-level or replacement depreciation.

Let us, for present purposes, assume a case in which a man of limited capital decided to go into the retail ice business. Investing $1,000 in a truck, he conducts his business entirely on a cash basis and, at the end of the year, has $1,000 of cash in his pocket. This is repeated the next year and the next for five years, at the end of which time the truck is not worth hauling away. The ice dealer might have assumed that he had made a profit of $1,000 in each of the five years. Any accountant or economist would have denied this and stated that the thousand dollars of profit reported in each year should have been reduced by a depreciation charge of $200. Had this been done, each year would have reflected a profit of only $800 and, over the course of the five years, the operator of the business would have recovered his thousand dollar investment plus $4,000 in excess (profit). It should be noted that, as a consequence of recording depreciation under the double entry bookkeeping system, two things would have been accomplished in each of the five years. First, net income would have been correctly stated and second, the invested capital would have been maintained intact by substituting progressively larger sums of cash in place of the declining value of the truck. Assuming a stable price level, our businessman could then replace the truck and repeat the cycle all over again. From this it seems clear that accounting based on an assumption of stable dollars is attempting, by the recording of depreciation, to both correctly determine net income and to prevent the impairment of invested capital. There is no denying that this accounting tool works and works well under conditions of stable prices. There is serious question, however, as to whether or not the tool is accomplishing the task under present day conditions.

Opinions Pro and Con

To many outstanding minds in the accounting profession, the inadequacy of present accounting procedures can be corrected only by some form of price-level depreciation. These individuals state that this is necessary for the following reasons among others. Earnings are seriously overstated in terms of real income. Taxes are based on phantom profits. The disparity between replacement cost and original cost leads stockholders to expect larger dividend payments than can be made. Unions are supplied with unsound arguments in support of demands for increased wages. Depreciation charges must be based on current price if capital is to be maintained. The determination of real (economic) income is necessary for intelligent budgeting for capital replacements and the formulation of sound decisions as to methods of financing and

in setting price policies. It is of no help to management, if current depreciation techniques result ultimately in recovering of dimes instead of dollars, to call these dimes dollars.

Those opposed state that accepted depreciation techniques are satisfactory for the following reasons. The upward trend in price is gradual enough to avoid the need of correcting depreciation for inflation. New equipment is more efficient than the old, thereby reducing unit costs. Thus there is a question as to how much of the increased cost of replacing equipment is due to changing price levels and how much to improvements in technology? If corporate profits are permitted to be reduced by the allowance of high depreciation costs, who is to pay the lost taxes? Much of the investment in fixed assets is financed through bondholders' money and the loss to the corporation is, in effect, merely passed on to the bondholders. Price-level depreciation would make published financial statements more confusing than enlightening to the lay reader. Further, are we depreciating the old asset or the replacement "nifo"? And would managements be willing to use price-level depreciation resulting in increased taxes in times of falling prices?

It becomes apparent that we, as accountants, are not at all certain as to what we are trying to accomplish by depreciation. Are we attempting to recover a fixed sum of dollars or provide funds for replacement of specific assets or maintain economic value of investment or arrive at correct asset valuations? In view of the fact that managements seldom replace assets with identical units, it is clear that we can not now attempt to depreciate in terms of an investment yet to be made. Furthermore, managements should not, by the very nature of a dynamic economy, be committed to the replacement of any specific asset. The vast bulk of opinion seems to be that the depreciation charge should concern itself solely with the determination of true income and maintenance of the capital investment in terms of purchasing power.

Can Index Numbers Be Used?

Toward this end, the use of index numbers has been widely proposed. This, of course, has been followed by a chain of controversy as to what index is most applicable for any given industry. There exist the Consumer Price Index issued by the U. S. Bureau of Labor Statistics, the Wholesale Commodity Index, the Construction Index and numerous other measures of the decline in the value of the dollar for specialized segments of the economy. However, so far as it is agreed that the objective is the maintenance of the purchasing power committed to fixed assets, there has appeared a rather general related agreement

that the Consumer Price Index is the most reliable and generally acceptable for all purposes.

The monumental work done in this area of the use of index numbers is represented by the two studies conducted by the American Accounting Association and published in 1955[1] and 1956[2]. These studies would indicate that, not only must price-level depreciation be used in determining true net income but that all financial statement figures must be equated in terms of current dollars. The object is to present statements in terms of the same dollar that the statement reader has in his pocket. That is the 1958 dollar, the 1959 dollar, etc., etc. Briefly, the theory is somewhat as follows:

> An index number is a percentage of the price level at a base date. The difference between the index numbers for any two dates can be used to determine the percentage change that has taken place. If the index of one year is 133.3 and that of a later year 146.6, the difference of 13.3 represents a 10 per cent increase in prices. The value of money is the reciprocal of the price level index. The base period index of 100, divided by the index of the given year, yields the purchasing power equivalent. For example:
>
> $$\frac{100}{150} = 67 \qquad \text{or} \qquad \frac{100}{200} = 50$$
>
> Through the use of the appropriate index number, dollars of any year can be converted into the same dollars as the cash, accounts payable, etc. appearing on published financial statements

Pressure For and Resistance To Change

Obviously, any such drastic change in generally accepted accounting procedures will engender feelings of foreboding and distrust in the minds of all practitioners as to its feasibility. However, as a practitioner, it is my own view that this development, like many others in the history of accounting, will, once we have gotten "our feet wet," soon become routine.

From time to time one hears expressions best characterized as wishful thinking—if only we close our eyes, the problem will go away. However, the tendency seems to be quite the reverse. Not only is the problem severe for all heavy goods industries but indications are that, if anything, it will become more aggravated in the future. Professor Sumner Schlichter of Harvard, a highly respected economist, has stated that inflation of approximately 2½ per

[1] *Price Level Changes for Financial Statements—Case Studies for Four Companies*, Ralph Coughenour Jones, American Accounting Association, 1955.

[2] *Price Level Changes and Financial Statements—Basic Concepts and Methods*, Perry Mason, American Accounting Association, 1956.

cent a year would probably be a good thing. The long-range forecasts of many economists, government and private, are based on the assumption that this is the pattern of the future. Moreover, industry is becoming increasingly critical of the accounting profession for its failure to come to grips with this problem. One of the best statements of the situation in which companies find themselves appears in the annual report of 1957 for the General Electric Company (page 27), as follows:

> "In the case of General Electric Company's plant and equipment, for instance, it is estimated that, without any further increases in present price levels, it would take about $2.4 billion to replace existing plant and equipment as it wears out, compared with the $1.5 billion in original cost which may be deducted for tax purposes as a depreciation allowance. This difference of about $900 million must, because of existing tax laws, be provided from present and future reinvested earnings. The $900 million is not for any expansion or increase in productive capacity. It represents only the amount which must be provided—over and above depreciation allowances—to maintain the Company's existing production capacity. To obtain this amount from reinvested earnings means that a much larger amount—at least twice as much—must be earned from operations to have $900 million left after taxes and dividends have been paid. Any future increases in general price levels will, of course, further accentuate this problem."

The April 5, 1959 issue of *Business Week*, page 79, gave prominence to the decision of the American Institute of Certified Public Accountants to again reconsider accepted accounting procedures for depreciation. One last reference would be to the editorial in the April 1958 issue of the *Journal of Accountancy* which states, in part:

> ". . . continental Europe, where inflation has gone much faster and further than in the United States or England, the price-level depreciation adjustments are used in a number of countries. In the International Accounting Congress, in Amsterdam last fall, all of the accountants from the European continent who discussed this subject favored use of current prices in depreciation accounts".

I would like to note in passing that, although our European friends have accepted price-level depreciation, "lifo", which has general acceptance in the United States, does not have similar acceptance in Europe.

This problem is crying for a solution and it is accountants who must solve it. I would like to hazard a prediction that the use of price-level depreciation by companies having a large investment in long-term assets will, within a decade, receive the same degree of general acceptance that "lifo", a once radical proposal, now enjoys.

Standards For Clerical Activities — Example of a Billing Section

by CARL JOHN

WHILE MUCH EMPHASIS has been placed on the measurement of productive, direct labor operations, and some emphasis on indirect operations such as maintenance and warehousing, clerical activities have often been avoided entirely. However, the performance standard is one of the most valuable means of obtaining control over almost any operation, clerical activity being no exception. Group and individual efficiencies (after-the-fact control) as well as productive capacities (before-the-fact control) can be readily determined. Management will, therefore, be able to accurately control operations by relating workload to manpower requirements, staffing accordingly, and insisting that actual productivity equal or approach what should be produced, based on the standard. Necessary adjustments can be made on a simple, measurable basis as the workload fluctuates.

In every office, the number of persons required to perform specific tasks has been determined, in one manner or another. While the measuring devices used for this determination are somewhat nebulous, manpower requirements are somehow determined and limitations are established. Production standards are, therefore, being established for clerical activities everyday in every office. It is true that these standards are, in most cases, unreliable. In most instances, personal experience or the experience of others forms the basis. Whatever method is used, its origin is traceable to past performance. The relationship of "what we did" to "what we should do" is unknown. Surely work measurement techniques should be applied to determine, on a more scientific basis, the true requirement for manpower, equipment, and facilities.

Problems: Production Units and Counts

A major obstacle to utilizing performance standards to control clerical work is the determination of a measurable unit of production for each activity. It is extremely difficult to obtain reliable work production counts from each individual. To overcome this obstacle, it is necessary to:

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1. Concentrate on group productivity of workers reporting to first-line supervisors.
2. Develop methods for obtaining production counts which will not generate additional workload.
3. Obtain counts which will be subject to audit.

Another obstacle which presents a problem is the circumstance that certain operations in offices occur with such irregularity that measurement is virtually impossible. The use of the telephone is an example of such an operation. Neither the number of calls per work unit nor the length of each call can be predicted accurately. This problem is best solved by:

1. Establishing standards for operations which occur regularly and are subject to auditable count.
2. Determining the proportion of time devoted to regularly recurring, measurable work and irregularly recurring, non-measurable work.
3. Applying a factor to the measured standard to allow for non-measured time.

The foregoing problems and their indicated solutions result in two axioms which come close to eliminating problems heretofore associated with measurement of clerical effort. Briefly stated, they are:

1. Work units must be chosen which are subject to count validation, either by mechanical means or by persons other than those performing the operation.
2. Standards must be established which provide complete coverage of all work accomplished within an organizational or functional area.

In most offices a sales order or some similar unit can be utilized as the unit of measure. The quantity of orders, for example, will largely determine, the workload of the mail opening section. To a degree, other sections will be affected, such as the accounting section, the order processing section, the stock records section, etc. As orders increase or decrease, the requirement for work will fluctuate. Study will reveal that there are specific amounts of work required by section for each order processed. If an office handles 100 transactions per day and requires 25 clerks to perform the various operations required to process these transactions, then it is evident that it requires an average of two hours to process one transaction. To carry this further, an analysis can be made of the amount of work required by each section to perform the necessary duties required for each transaction. It will reveal that, for every 100 transactions, there is a requirement for a specific number of hours in the mail opening section, the order processing section, the stock records section, etc.

By applying work measurement techniques, such as time study or ratio-delay study, the amount of time required per transaction by section can be established. A production count of the total transactions processed at the end of each day will, therefore, indicate the number of hours required per section to complete the workload. The total hours actually expended can then be compared with the hours allowed to determine the degree of effectiveness with which each section performed.

Studying a Billing Department

Before attempting to apply work measurement techniques to so called "desk work" operations, a thorough study must be made of the duties required to accomplish the total workload. Functions and responsibilities must be studied to identify them with a specific organizational entity. Organization charts should be prepared in complete detail, with names and numbers of employees included. The movement of papers within specific areas and other related areas of a department should be charted.

A billing section is a necessary function of most commercial and industrial organizations. A typical billing organization is staffed with inventory clerks, invoice release clerks, and file clerks. As previously stated, any attempt to establish performance standards must begin with a study of the existing

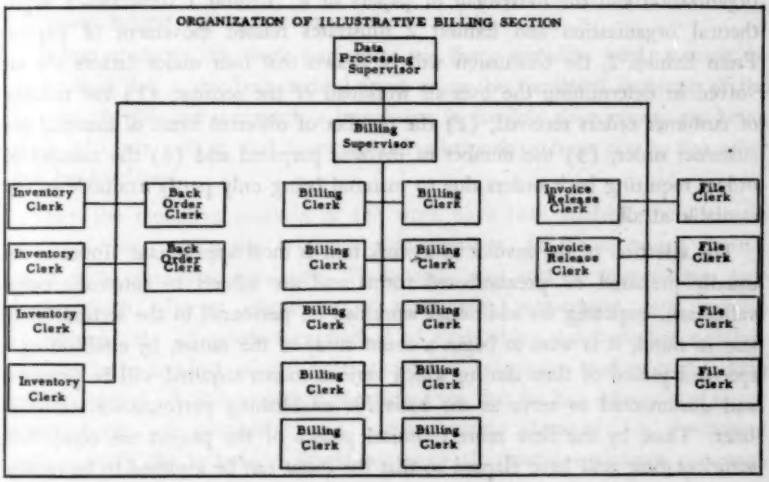

EXHIBIT 1

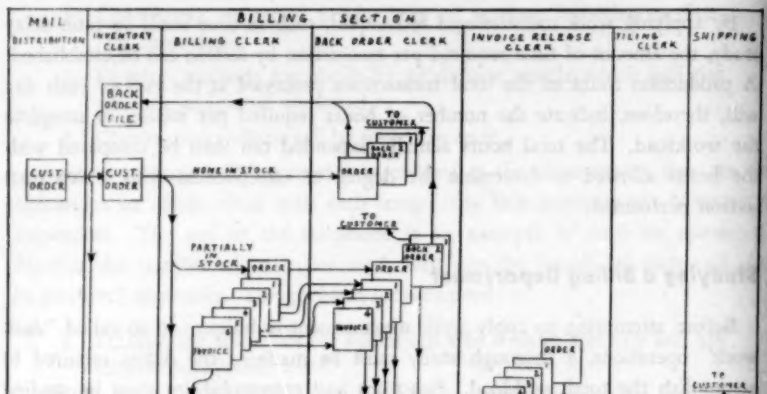

EXHIBIT 2

organization and the movement of papers in it. Exhibit 1 illustrates a hypothetical organization and Exhibit 2 illustrates related movement of papers. From Exhibit 2, the conclusion will be drawn that four major factors are involved in determining the over-all workload of the section: (1) the number of customer orders received, (2) the number of different items of material per customer order, (3) the number of invoices prepared and (4) the number of orders requiring back orders due to material being only partly available or not available at all.

The selection of the invoice as a work unit is most appropriate. Invoices are usually prepared on prenumbered forms and are subject to automatic count validation, imposing no additional workload on personnel in the section. With this in mind, it is wise to begin a count study at the outset, by establishing a specified period of time during which various counts required will be prepared and documented to serve as the basis for establishing performance standards later. Thus, by the time more technical phases of the project are completed, sufficient time will have elapsed so that the count can be assumed to be reasonably valid.

In the present example, the following information would be recorded during a predetermined period of time:

1. Number of customer orders,
2. Total number of different items of material (number of commodity cards handled by inventory clerks),
3. Number of invoices prepared,
4. Number of back orders prepared.

The actual development of standards involves the use of various work measurement techniques such as stop watch time study, predetermined time systems, and ratio-delay study. The choice of techniques should suit the type of operation involved. In conducting the studies, two factors should be kept in mind in this case. One is that the invoice has been selected as the work unit which will be measured. The other is that the study must cover all work performed by all personnel of the billing section.

In studying the inventory clerks, it will be quickly revealed that the location and analysis of commodity cards and the stock entries on them, consume the major portion of the time. At this point, another factor may be introduced. If the inventory clerk devotes considerable time to posting stock receipts to commodity cards, another count will be necessary to determine the relationship between the number of receipt entries and the invoices processed. Obviously the count phase may become rather complicated, but it is basically a one time operation, subject only to infrequent future validation.

Before studying the work performed on the commodity card, it must be ascertained that a standard derived from it can be translated in terms of the invoice. In this instance, such a translation is possible since counts are being made of cards, orders, and invoices, and relationships from one to the other will be developed.

Once the repetitive portions of the work have been studied, there remain those portions which are relatively non-repetitive, i.e. those which do not occur with consistent regularity. These operations include telephoning, conferring with adjacent employees or supervisors, researching data, writing memoranda, etc. A satisfactory method of establishing standards for such operations is to conduct all-day time studies or ratio-delay studies over a long enough period of time to satisfy the technician that he has witnessed a representative mix of measurable and non-measurable elements. In conducting such a study, the technician would segregate all repetitive elements into one category and all other elements into one or more categories as desired.

Establishing the Standards

In studying the inventory clerks, the following may be revealed:

1. Repetitive work elements require .50 minutes per commodity card.

2. 50 per cent of the worker's time is devoted specifically to repetitive elements and 50 per cent to irregularly recurring but necessary elements.

Therefore, the standard would be one minute per commodity card. If 400 cards are handled per day, 400 minutes should be required to perform all necessary work. Obviously, it could not be established that each card would require one minute's work. Such a standard is valid only when applied to a considerable volume of cards, a day's production being more meaningful than an hour, a week better than a day, etc. The same procedure would be followed throughout the organization. Standards would be established for the billing clerks, the back order clerks, the invoice release clerks, and file clerks, always conducting the studies in such a manner that the data is translatable to "time per invoice," such time covering one hundred per cent of an employee's work. Exhibit 3 illustrates the results of such a study. Times and percentages have been expressed as whole numbers to simplify presentation.

TIME DATA FROM STUDY OF BILLING SECTION

EMPLOYEE	WORK UNIT	Standard Time Repetitive Elements	PERCENTAGE Repetitive	PERCENTAGE Other	Total Standard Time
Inventory Clerk	Commodity Card	.5 Min.	50%	50%	1 Min.
Billing Clerk	Invoice	2.25 Min.	75%	25%	3 Min.
Back Order Clerk	Back Order	2.25 Min.	75%	25%	3 Min.
Invoice Release Clerk	Customer Order	.6 Min.	60%	40%	1 Min.
File Clerk	Customer Order	1.4 Min.	70%	30%	2 Min.

EXHIBIT 3

All that remains is to apply the standards derived to the counts obtained and determine a standard time per invoice for each segment of the organization. Assume that a four week count was obtained and revealed the following data:

No. of customer orders	13,000	No. of invoices	26,000
No. of commodity cards	32,500	No. of back orders	3,250

Relating each count to the invoice count, there are .5 customer orders, 1.25 commodity cards, and .125 back orders per invoice. Applying this data to the

standard in Exhibit 3 the following work unit standards would be derived:

Employees	*Standard time per invoice*
Inventory clerks (1.25 x 1)	1.25 Min.
Billing clerks (1 x 3)	3.00 "
Back order clerks (.125 x 3)	.375 "
Invoice release clerks (.5 x 1)	.50 "
File clerks (.5 x 2)	1.00 "

Invoice Processing & Count-Billing Section

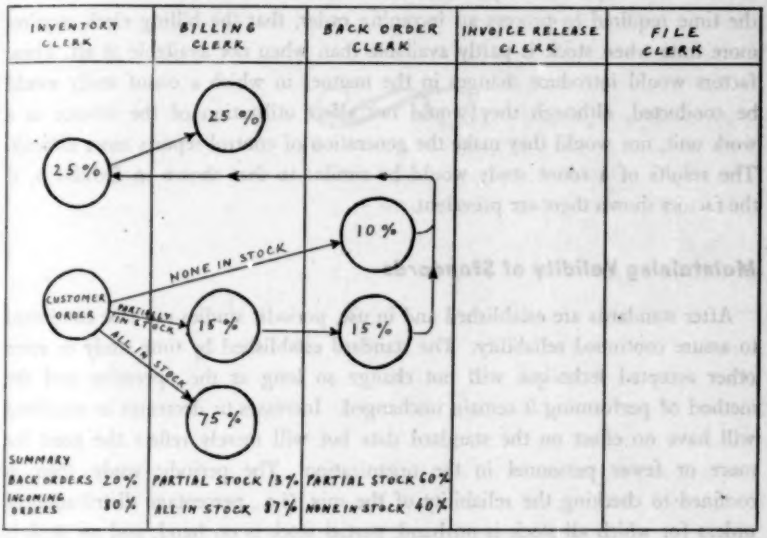

EXHIBIT 4

In applying this data, it is only necessary to count invoices per day, week or month. If 6,000 invoices are processed during a period of one week, a control report would be generated as follows:

Employee group	*Std. minutes*		*Actual minutes*		*Efficiency*	
Inventory clerks	(6000x1.25)	7,500	(4x60x40)	9,600	7500 / 9600	78%
Billing clerks	(6000x3.0)	18,000	(10x60x40)	24,000	18000 / 24000	75%

					2250	
Back order clerks	(6000x.375)	2,250	(2x60x40)	4,800	4800	47%
					3000	
Invoice release	(6000x.5)	3,000	(2x60x40)	4,800	4800	62%
					6000	
File clerks	(6000x1.0)	6,000	(4x60x40)	9,600	9600	62%
	Total	36,750		52,800		70%

Application of the standard to the items counted is seldom as simple as illustrated in the example above. In practice, it may be found, during the period over which various operations are being studied, that the time required for the inventory clerk to process orders from the back order file differs from the time required to process an incoming order, that the billing clerk requires more time when stock is partly available than when not available at all. These factors would introduce changes in the manner in which a count study would be conducted, although they would not affect utilization of the invoice as a work unit, nor would they make the generation of control reports more difficult. The results of a count study would be similar to that shown in Exhibit 4, if the factors shown there are prevalent.

Maintaining Validity of Standards

After standards are established and in use, periodic studies must be conducted to assure continued reliability. The standard established by time study or some other accepted technique will not change so long as the operation and the method of performing it remain unchanged. Increases or decreases in workload will have no effect on the standard data but will merely reflect the need for more or fewer personnel in the organization. The periodic study, then, is confined to checking the reliability of the mix (i.e., percentage distribution of orders for which all stock is on hand, partial stock is on hand, and no stock is on hand), and checking the relationship of items counted in the original count study to the measurable work unit, i.e., customer orders, commodity cards, and back orders related to invoices.

The first check may be conducted three months after work standards are initially established. The results of this check should govern the timing of future checks. If original counts are validated within a small percentage of the original, future checks may be performed semi-annually or annually. If the percentage distribution and/or mix has changed radically, new standards should be developed, using the current data, and another count should be obtained shortly thereafter. A detailed data check should not require more than a week's

experience, and, even if performed quarterly, should prove economical with respect to the advantages gained from reliable labor utilization reports.

The procedures described in this article are designed to provide managements with a reliable means of budgeting clerical requirements which will result in savings in time, effort and money. Although the initial development of the standards may be somewhat involved, the resulting controls will prove worthwhile from the standpoint of sound economics. Their use will provide a tool of control when one is badly needed. The practicality of standards for clerical operations is readily demonstrable, if they are properly developed and applied.

Making Forms Control Work For the Company

by ALFRED C. ARNOLD

ELEVEN MILLION Americans are engaged in writing, working with, and storing the billions and billions of pieces of paper that are used in running the country and its economy. The cost of the printed forms on which most of the writing is done, while important in terms of dollars, is much less than the wages of the workers who prepare, process, and file the forms. The labor savings potential of systematic control over the creation of new forms and the elimination or simplification of existing forms is, then, much greater than possible savings in form cost.

Organization For Forms Control

The extent of the area for savings influenced the decision to assign responsibility for forms control at Electric Boat Division to the systems manager. In fulfilling his other systems and procedures responsibilities, the systems manager automatically keeps himself currently informed about paperwork requirements throughout the plant. Consequently, he is well-equipped to make sure of effective procurement of properly designed forms at a minimum cost consistent with those requirements. The systems manager discourages the creation of unnecessary new forms. He suggests the elimination of existing forms that are not now needed and the elimination of unnecessary items of information from forms that are being revised. If something about a form indicates the existence of a procedural weakness, he may assign the problem to one of his systems designers for study and recommendation.

A forms control section reporting to the systems manager gives aid, advice, and service to all departments in order to achieve good forms design, economical forms procurement, and effective forms inventory management. This section also maintains the system of form identification numbers, maintains a complete file of form samples and specifications, reviews all purchase requisitions for forms, and participates in establishing order points and quantities.

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Inventories of printed forms are, for the most part, maintained in the stationery stores section of the storehouse. This section maintains records of orders, receipts, and on hand quantities. It also, with the advice and assistance of the forms control section, establishes order points and order quantities for all printed forms on the basis of usage and lead-time required for procurement. In general, order points are determined by multiplying the average monthly usage by the number of months it is anticipated will be required for forms procurement. The order points are an indispensable aid in assuring the replenishment of stocks far enough in advance of required delivery dates to permit routine and economical procurement. Timely procurement on the basis of carefully established order points eliminates the excessive costs usually associated with emergency procurement of forms when stocks are unexpectedly depleted.

Any department that is the sole user of a form may, at its own option, store the entire supply of that form within the department. This option, however, carries with it the responsibility for requesting re-order of that form early enough to permit use of normal procurement routine.

Forms Procurement—Determining Requirements

Forms procurement begins in one of three ways:

1. Whenever the quantity of a form stocked in the stationery stores section falls below the order point, this section writes a request for re-order of supplies and sends two copies, together with four samples of the form, to the forms control section. The section, before taking steps to get the forms, obtains, on one copy of the request, the approval signature of the head of the department to which the form will be charged.
2. A department recognizing the need for a new form or for the revision of an existing form prepares a purchase requisition in duplicate. The requisition is signed by the department head or his delegate. The department also fills in a forms data sheet in so far as it is able to do so. Both copies of the requisition and one copy of the forms data sheet are sent to the forms control section, along with a rough sketch of the required new form or revision. The forms control section completes the forms data sheet and discusses the proposed usage of the form with the originating department in order to determine the most efficient and economical design for the form.
3. A department wishing to re-order a form over which it has sole control, including the stock maintenance function, writes a pur-

chase requisition in duplicate and sends both copies, together with four samples of the form, to the forms control section. In this instance, too, the requisition is signed by the department head or his delegate.

It is to be noted that, in each instance, the department head, personally or by delegation, is required to approve the procurement of all printed forms that will be charged to his department. The cost of printed forms is distributed by department in a special overhead account so that department heads may be kept informed of the amount of this sizable item of overhead and participate in its control. No inventory account is maintained for the stock of forms. Instead, forms cost is charged to the special overhead account at the time they come in from the printer.

Upon receipt of a purchase requisition or a request for re-order of supplies together with samples of the form, a rough sketch, or a forms data sheet, the forms control section determines the following:

1. Whether another form, already on hand, will serve the purpose.
2. Whether the identical form is being ordered by more than one department.
3. Whether improvements can be made in the design of the form.
4. Whether the forms should be printed by Electric Boat Division's own graphic arts equipment.
5. Whether a change in the construction of the form could be made to reduce its cost or permit more efficient use.

Forms Procurement—Printing or Buying

If it is determined that the forms should be printed at Electric Boat Division, the forms control section writes a request for forms manufacture and sends it to the graphic arts department. If the request is for a form that has been printed before, the section sends two copies of the form along with the request. If the form is new or revised, the section prepares and sends along with the request an original suitable for reproduction on offset process printing equipment. On completion of the printing job, the forms control section gets a sample of the form for inspection and approval before the lot is delivered to the stationery stores section or to the using department. The graphic arts department prints forms only when authorized to do so by a written request from the forms control section.

If the forms must be purchased, the forms control section prepares form

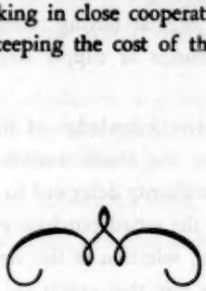
printing specifications. In the case of a new or revised form, the section prepares the necessary copies of the forms layout. The forms control supervisor approves the order by signing the purchase requisition that was submitted by the department requesting the form. In the case of a re-order, the forms control section makes sure that it has enough samples to send to bidders and writes a purchase requisition unless the using department stocks the form and has already written a requisition. In the latter case, it is necessary only that the forms control supervisor approve the requisition by signing it. The forms control section may then proceed to get bids from several qualified forms manufacturers in accordance with regular buying routines. This action is taken in order to keep the regular sources of supply competitive or to establish new sources.

Because of his comprehensive knowledge of the technical aspects of forms construction and manufacture, the forms control supervisor acts as the buyer for all printed forms under authority delegated to him by the purchasing agent. Although, in every instance, the actual purchase order is completed and signed by the purchasing department, selection of the vendor is left to the forms control section in order to make sure that orders are placed with vendors who are properly equipped to assure delivery, quality of workmanship and material as required. The purchasing department honors no purchase requisition for printed forms unless the requisition has first been cleared by the forms control section as evidenced by the signature of the forms control supervisor on the requisition.

All purchased printed forms are delivered to the receiving department where the quantity is checked and a receiving report is issued. By specific arrangement in each instance, first deliveries by new vendors, first deliveries of new or revised forms, or deliveries to be forwarded directly from the receiving department to the using department are held at the receiving department pending approval of samples by the forms control section. After the samples are approved, the forms are sent to the stationery stores section or other location where the stock will be maintained. In all other instances, immediately after the forms are received, they are released by the receiving department to the stationery stores section. The latter sends samples from the new lot, together with one copy of the receiving report, to the forms control section where the samples are inspected for quality of paper, quality of printing, and format. Forms that do not meet specifications are rejected in accordance with normal rejection procedures.

A Technical Function Assigned to Technicians

The one who first conceives a form is usually expert in something other than forms design, layout, and construction unless he happens to be a forms specialist. Usually, also, the area in which he is expert coincides with the area of his responsibilities. He knows what the form will do for him and perhaps what it will cost his department to process it. Rarely, however, does he know what it will cost other departments that may have to handle it or exactly how it will affect the whole enterprise unless he also happens to be a systems and procedures specialist. At Electric Boat Division, forms design and procurement are handled by informed specialists working in close cooperation with systems analysts and designers. This results in keeping the cost of the forms and their processing under control.



Preparing and Pricing a Parts Catalogue on Tabulating Equipment

by FLOYD E. THOMPSON

TODAY we live in an era when it is necessary, not only to establish selling prices on a profit-making basis but also to satisfy a more critical clientele and remain competitive. A customer with more than one make or brand of similar equipment before him can compare the prices he pays for repair parts, and his decision in purchasing additional new equipment could very well hinge on his conception of fairness of prices on parts required to maintain the machines. It is, therefore, doubtful practice to establish selling prices through the use of a fixed percentage of markup which does not consider the type of product.

Old Style—An Exhaustive List, Manually Priced

Until three years ago, our price list included practically every item which had been sold as a repair part at one time or another. The result was a voluminous listing expensive to maintain. Over the years, many machine models have been discontinued and replaced and the point is eventually reached at which there is practically no demand for repair parts for the discontinued models. Thousands of inactive items were needlessly included in our price list.

The length of the list compounded the greatest difficulty facing us—price changes. During the past few years, we have been confronted with an annual round of labor and material cost increases, which have necessitated selling price increases. Our revisions were hand calculated and the entire price list re-typed using every available typist. The typewritten sheets were then sent to the printer, who set the type and, through photo reduction, decreased the size of print in order to attain a sheet of proper dimensions to fit our binders.

Needless to say, manual figuring, typing and printing created a very expensive operation. The outcome was a very thick book which was neat and attractive but not at all flexible in so far as price changes were concerned and did

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not lend itself to the use of supplements, although it was necessary to issue many. Aside from this, the expense of compiling and printing such a book was so great that it was quite impractical to print a new listing frequently. We tried to expand the use of this book by instructing our distributors to apply percentage markups to the printed list to obtain current prices. Since cost increase percentages vary as between labor and materials, it is obvious that the application of percentage increases would, in the end, fail to conform to our intentions as to relationship of cost to selling price.

The realization that we must have a price list with more flexibility and less expensive maintenance led us to believe that the accounting department, with its wealth of information and access to tabulating equipment, was in the most favorable position to compile and service a new-style pricing medium. We had to be in a position to adjust prices conforming to change in cost and to furnish our distributors with new price lists or a workable supplement with a minimum of time, labor, and expense. The accounting department proceeded to develop a plan.

Shortening the Parts List

Probably one item of greatest concern in establishing and maintaining a price list is determining which items should appear in the listing. At the very outset, there will be errors both ways. To include slow-moving or obsolete parts creates a heavy load on the pricing department when reviewing prices. To leave out items which move with some regularity imposes a problem, as the parts editors are handicapped by having to contact the pricing department on every inquiry.

To help solve this condition, we made use of an activity report furnished us by the tabulating department every six months. These activity reports are developed by tabulating the stores issue cards to show all of the repair parts sales by item number, the number of orders processed for each item, and the total quantity sold during the past six months period. A review of this report gives us the necessary information to add to the price list those items which are selling and to delete those which have become inactive. In preparation for an approach to the new price list, we made use of stores issues for repair parts sales during a three-year period.

In spite of good record keeping and careful screening of information in the engineering department, there is always the possibility of duplicating items through the years. (We have machines in the field which have been in operation for fifty years.) In order to obtain a list of items free of duplications,

cross indexing should be developed. This can be achieved by working with the spare parts, or service department, and studying the complete line of items to ascertain if there are parts bearing different item numbers which are of the same specifications, or if there are items so similar that one might be used in place of the other. When similarity of parts is discovered, the item least used is cross indexed to the more current number and substitutions can be made when orders are compiled. This action will reduce the volume of the listing and prevent a duplication of parts in the price list. The numerical index book is placed in the hands of all distributors as well as our own parts editors to aid them in writing orders (Exhibit 1).

INTRODUCTION TO NUMERICAL INDEX

Following are examples from the Numerical Index, how it works and how it is to be used for editing parts order.

	A.	B.	C.	D.	E.	F.		
	SYMBOL	PART NO.	DESCRIPTION	WEIGHT	USED ON MACHINE MODELS	ORDER QTY.	ORDER PART NO.	ORDER DESCRIPTION
1.		AA84	Bolt		LS70,71,85,90	1 2	AA84 AB442	Bolt Nut
2.		AA171	Shoe,30" Tread	70.0	LS70,71,80,85, 90	1 1 2 2 2	AA171 AE245 1X545 1X153 1X30	Shoe, Tread Pin Bolt Nut Lockwasher
3.	•	AA176	Flexo-tube		LS85,90		AA441	
4.	•	AC137	Chain		LS40,50	62	XS512	Links
5.		AC1555	O-Ring		K500		Refer	P.G. 352

INSTRUCTIONS

Column A. Symbol (•) designates non-returnable part, symbol (♦) designates duplicate part numbers, and description should be checked for part needed.

Column B. Part numbers are listed in Alphabetical order and then numerical order. The Index is divided into the following sections: Alphabetically A thru Z, plain numbers 1A thru 1Z, 2A thru 2Z and 3A thru 3Z.

Column C. Description column.

Column D. Weight column. Last column within the weight column shows tenths of a pound.

Column E. Indicates the various models on which a part is used.

Column F. Indicates the interchangeable or replacement part, or, group of parts to be ordered. (Refer to examples.)

EXHIBIT 1

Mark-up Factor Analysis and Coding for Pricing

With a good numerical index to work with and using only the parts shown as "good," the task then is to establish the selling price on all items which

will appear in the price list. In establishing the markup factors by which we arrive at selling or list prices, it is our belief that each item should be priced in accordance with the type of material used and the equipment necessary to manufacture it. We do not feel it fair to use the same percentage of markup against a piece of plain shafting, which may have only a cut-off and key-seating operation on it, as we would use on perhaps a cut gear which requires the use of an expensive machine tool. By the same token, we would not use the same percentage of markup against a simple weldment as we would against a machined casting on which we have the high cost of making patterns and the expense of maintaining pattern equipment. There are also many purchased items on which the vendors have an established list, or consumer's price, which must be adhered to.

In view of our policy of markup, we grouped the products, established a coding system, and classified them as follows:

Class 1—Manufactured expendable items for all current models of machines, all non-current models of crawlers and rubber tire mounted machines, and items common to both crawler and locomotive cranes. All parts in this class to be priced according to type of items, such as:

1. Weldments, finished shafting and other structural items.
2. Plain items with sawing operations only.
3. Machined parts (castings, except cut gears)—Large costly items for large machines.
4. Cut gears.
5. Castings with no labor required except track shoes and counterweights.
6. Track shoes (Classified to small and large machines).
7. Counterweights (Classified to small, medium, and large machines).
8. Crane booms and extensions (Classified to small, medium and large machines).

Class 2—Purchased items. All shelf items should be priced, whenever possible, at the vendor's list.

Class 3—1. Large items for small machines, such as lower frames, rotating bases, shovel booms, dipper sticks, etc.

2. Expendable items applicable only to locomotive cranes.

Class 4—Large items for large model machines, obsolete models and locomotive cranes.

Each of the above classifications and their sub-classes has a different percentage of markup applied to the manufacturing cost to arrive at a selling price. In reviewing the cost, we give attention not only to the rates which apply to the labor operation but also to the machine tool on which the operation is performed. The type of operation and the machine tool are both important elements to be considered in determining the markup, as we use departmental overhead factors. If we were using machine burden units in arriving at cost, it would not be necessary to make such compensations when pricing.

Prior to three years ago, all elements were priced on the same markup and all items bore the same rate of discount to our distributors. In pricing by accounting, the decision to use markup factors by classification meant that many items of low markup would result in giving the distributor less discount on the billing price and would leave less profit for ourselves. It was important then that a very close check be kept on the low markup items, as any fluctuation in purchase price could easily cause us to incur loss rather than profit on these.

LB-S PRICE STRUCTURE WORK SHEET

ITEM NO.	DESCRIPTION	PRESENT SELLING PRICE	WEIGHT	CODE	PREPAID FREIGHT	MFG. COST	MARK UP %	CONSUMERS PRICE	DISC. %	DEALERS NET	DATE
CA88	BEARING	51 19	250	28	1 25	32 01	150	49 25	12	42 25	9/58

EXHIBIT 2

The new price list was to embrace approximately fourteen thousand items. Each item was reviewed to ascertain the type of product, the manufacturing operations required, and the classification before establishing a price. A work sheet (Exhibit 2) was designed and steps were taken, not only to price the item but also to code it to facilitate price adjustments at later dates. A code system was devised under which a code letter shows for each item on the price list which portion of the manufacturing cost is labor and burden, which portion is material, and the type of material used in the manufacturing of it. Our code was divided into sixteen groups and one of these groups, which is comprised of buy items, was broken down into nine additional categories (Exhibit 3).

Price Computation In Action—on Tabulating Equipment

With the tabulating master deck of the price list bearing a code number for each item it is possible to pull any group of cards pertaining to a particular type of material and make price adjustment in conformity with the cost trend of the raw material used in the piece part. In the event of notification of price change on purchased items. it is a simple procedure to have the cards sorted

PRICE LIST CODING

Code	Material	Class	% Breakdown - Cost Over or Under 50% of Total Mfg. Cost: Material	Labor & Burden
A	Steel	01-102-202-03-04	over	under
B	Steel	01-102-202-03-04	under	over
R	Assemblies or weldments - castings - steel		over	under
S	Assemblies or weldments - castings - steel		under	over
T	Castings - bronze	09	over	under
U	Castings - bronze	09	under	over
X	Assemblies or weldments (must be reworked due to complexity of material content)			
Y-1	Casting no labor	107	Z-2 Buy items - bushings	
Y-2	Casting no labor	08	Z-3 Buy items - fasteners	
Y-3	Casting no labor	09	Z-4 Buy items - sprockets	
Y-4	Casting counterweight	207	Z-5 Buy items - buckets	
Y-5	Casting tread shoes	208	Z-6 Buy items - O rings,	
Z	Buy items		Z-7 Buy items - fittings, all types	
Z-1	Buy items - chain		Z-8 Buy items - bearings	
			Z-9 Buy items - kits	

EXHIBIT 3

from the master deck by code number, make the price adjustments, have a price list supplement printed and return the cards to the deck. On processed items, the master deck can be sorted, again on the basis of manufacturing cost breakdown, and a varying per cent of increase applied to reflect changes in the cost pattern. As an example, labor might increase 4 per cent and castings 8 per cent. In following through, we might select all items with a labor and burden content in excess of 50 per cent and increase selling price 5 per cent, whereas on items for which labor and overhead content was less than 50 per cent, an increase of 7 per cent would be applied. This procedure enables us to maintain our cost-to-selling price relationship.

Supplements to the price list are made whenever there are enough price changes or new items added to warrant the printing. When it is advisable to issue a new supplement, additional cards are merged with those making up prior supplements. A new supplement, therefore, replaces the previous one and it is then necessary to refer to only one supplement. However, it seems best to avoid sending out very many supplements between the printings of the price list, itself, as this makes it difficult for the distributors to maintain their price lists. More frequent printing of a new issue is better than loading the distributors with a huge supplement to which they must adjust their pricing medium. Whenever a general overall increase in prices becomes effective, we print a new issue of the complete list. With the present system, revised issues can be completed in three to four weeks.

Regardless of how efficient the methods and rate setting department may be, in relationship to the work load they bear, it is quite possible that, in establishing selling prices, certain items will be found without incentive rates or with only a portion of the operations rated. In such instances, a pricing factor may not be followed to the letter but, rather, it is the responsibility of the department to "weigh," or study, the cost and compensate for the lack of incentive rates on the piece part in question. This situation is most apt to exist on obsolete or slow-moving items.

Where no incentive rate or standard has been established on certain operations, it is our practice to adjust our markup in accordance with the amount of rated operations shown.

Parts for Obsolete Machines; "Price on Application" File

In the beginning it was our belief that all items in the price list should stand on their own and that, in every instance, we should receive a profit on our sales. However, we were soon to learn that this hope could not be realized. As stated earlier, we must furnish repair parts for machines which have been in the field for many years. Often we have requests for piece parts which were originally manufactured from castings. The patterns for many of these castings have been scrapped so we must ask the engineering department to furnish new drawings in order to fabricate the part in our shop. The cost of manufacturing is considerably higher than it would have been had the patterns still been in existence and castings available.

Although items for obsolete machines do not develop a great volume of business, they do occur with enough regularity that we cannot treat them as exceptions. We have, therefore, realized that, in such instances, our repair parts items can not stand on their own profitwise but, in some instances, must be sold at a price high enough to recover cost only. The final decision reached was that our profits must be obtained from items which are current and from repetitive non-current pieces. Lower profits must be accepted on slow-moving items and the parts for obsolete machines must be priced according to our best judgment, without penalizing the customer who owns obsolete equipment.

The slow-moving items are removed from the price list and are marked in our numerical index as "price on application." A file of 3 x 5 cards is maintained in the pricing department for such items (Exhibit 4). Notation is made on these cards if there is no balance in stock. When inquiries are received, we ask our methods department to study the part and, if tooling or patterns have been scrapped, methods personnel gives us a new routing and labor rates on

"PRICE-ON-APPLICATION" CARDS

9/58

ITEM NO	DESCRIPTION
EN 40	HOIST DRUM

WEIGHT	CODE	FREIGHT	MFG COST	MARK UP %	CONSUMERS PRICE	DISC %	DEALERS NET
1520	G	760	88 28	220	201 82	25	151 37

EXHIBIT 4

the piece. From these "methods estimates" we calculate a cost, fix a price and quote the customer. This we find far more satisfactory than trying to keep current prices on several thousand obsolete items.

Used Costs Are Checked Costs

Pricing by accounting places the pricing supervisor and his staff in a position to be of great assistance to the cost accountant. In order to establish selling prices, the cost records must be scrutinized. Any discrepancies or errors will be noted and reported to the cost accountant for correction or adjustment. No one in the organization will study more costs than one working on prices.

The same is true in checking customer orders. Since our billing is done by a card-a-type, the contents of the price list are set up on billing cards. If a billing clerk encounters an item on an order for which there is no pre-punched card, the order is referred to the pricing department. The pricing personnel will check the item to determine if it is slow-moving, new to the line or whether the parts editor has failed to pick up the cross reference in the numerical index. If the fault lies with the parts editor, he is notified and the shipping order, packing list, and stores issue cards are corrected to match the billing. If the absence of a pre-punched card is due to slow-moving parts, the price is entered on the order from the "price on application" file. On a new item, the pricing department obtains cost from the cost department or asks for a methods estimate. After pricing the order, if the cost seems to be in line, the item is entered on the list to be placed in the price list or to be included in the next supplement. If the cost on a new item appears high and is challenged, the part in question goes into the price on application file until cost has been revised or proven correct.

It has been mentioned earlier in the article that not all items bear the same rate of discount. For this reason, our price list is designed to show a list and net price to the distributor. This has proven to be a time saver, as there is no need for the billing clerk to search out the items bearing the various discount rates and then figure the net amount of the invoice. When the item on an invoice is entered, a total may be struck and the invoice is ready for mailing.

Price Changes; List Supplements and Reprints

Having had experience with the prior cumbersome arrangement, it was most important to us that our new system embrace the fundamental principle of simplicity. In other words, we needed a procedure with flexibility to allow for changes, additions or deletions to be made without great expense and with the utmost speed. It was because of that tabulating equipment was utilized. Without adding any new equipment, we were able to set up our price list on punched cards showing all the information which appears on our work sheet. Space is provided for listing the pertinent information to be recorded in event of price adjustment.

With this arrangement, if costs of manufactured items change or when notification from a vendor informs us that prices on its product are being changed, the punched cards are sorted by the type code and reproduced, omitting the cost, list, and net prices. These cards are given to the pricing department, which fills in the omissions and returns the cards for key punching. When punched, the cards are sorted by item number and listed on multilith mats or masters, which are run on our multilith machine, thus printing the supplement pages. The supplement is on its way to the distributor in a very few days after we have received our notification of price adjustment.

LINK-BELT SPEEDER PARTS PRICE LIST ISSUE 4

PART NUMBER	DESCRIPTION	CLASS	APPROX. WEIGHT	LIST PRICE	NET TO DISTRIBUTOR
CT 13	BEARING		20	94.20	70.65
CT 14	BEARING		8	27.68	20.76
CT 15	BEARING		3.5	13.52	10.14
CT 17	SEAL		1	9.15	6.86

EXHIBIT 5

A complete reprint of the Parts-Price List (Exhibit 5) is a much greater job, obviously, than the issuance of a supplement but is handled in much the same

manner. The pricing department works toward the new run, lists changes which are due to cost adjustments, asks for the tabulating cards of the items affected, and makes the necessary entries. These cards are held out of the deck until it has been determined to what percentage of markup the general run of items should be adjusted, owing to changes in labor and burden rates and to change in cost of raw castings and steel. When all elements have been calculated, the tabulating department sorts the master deck by type code and calculates new prices for each code. Any cards held out are then merged and all are reproduced for the new deck. This new deck is sorted by part number and then listed on multilith masters on the accounting machine. New billing cards are reproduced for the card-a-type billing tub files, old cards are pulled and new ones filed for the billing clerks on the "effective date" of the new price list and/or supplement.

With much less effort and great cost savings through the use of tabulating and multilith equipment, we now find that new price lists can be issued much more frequently. Supplements may also be issued between new listings and prices are indeed kept more current than ever before.

Accounting Has the Information Needed

Someone has said that profit planning demands that thinking be done before, not after, the event. Pricing by accounting does exactly that. If we, as accountants, are to spend our time and energy on budgets, procedures, research and analysis to aid management in developing profit, why stop when the final step is to be taken in that direction, namely, establishing prices. The accounting department of an organization has a wealth of information and statistics at hand so let's use the knowledge it possesses and do our pricing by accounting.

Learning Curve Techniques For More Profitable Contracts

by RONALD BRENNECK

THE LEARNING CURVE has proved to be an invaluable tool for pricing purposes. It is of equal importance in conveying to production personnel what is expected of them and to top management the probability of production achieving these goals. When management has committed itself to manufacture a product for a given sales price, the agreement must be translated into a workable measure of production task, namely, direct labor hours allowed per unit. It is important at this point that management use a consistent mathematical approach in evaluating the actual experience in relationship to quotation hours. The learning curve is just such a tool which can provide many of the answers to management's questions if valid information is available for analysis. Examples can be readily cited. When a portion of a given contract is complete, profit measurement in the form of break-even analyses is required. It provides information to management as to how the shop must be budgeted in order to achieve the overall goal of a normal profit. This budget should be presented to the manufacturing division of a company in the form of a learning curve. The production staff should be provided with a breakdown of manpower requirements by division or department to achieve the requirement set forth by the budget curve. This will enable the production department to evaluate its workload in relation to other contracts in process, so that the personnel department may be advised if additional employees may be needed to accomplish the task. An important by-product of manpower requirements analysis is the evaluation of inventory in process, so that management can provide proper financing to carry the contract to completion without undue strain on the financial resources of the company.

For Contract Sales Prices and Production Cost Goals

The average unit direct labor hours built into a unit selling price are usually based on a learning curve positioned on the graph by estimated standard hours factored for realization, either at Unit 1 or some subsequent unit on the curve.

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By realization, we mean the ratio of standard hours to the anticipated actual production hours at a given unit expressed as a percentage. The unit number at which this realization is set is determined by management's evaluation based on past experience as to what performance can be expected of the production staff for the task at hand. Take, for example:

Unit Price Breakdown for 50 Units

Direct labor hours		125.0
Direct labor amount	$2.50	$ 312.50
Factory Burden	3.50	437.50
Direct material		467.50
Outside production		120.00
Eng. and Tool maint.	.90	112.50
Factory cost	$6.90	$ 1,450.00
Selling & admin. exp.	.58	72.50
Total cost	$7.48	$ 1,522.50
Profit		152.25
Unit selling price		$ 1,674.75
Total contract value		$83,737.50

The goal to be achieved was 55 per cent realization, based on a standard of 35 hours per unit by Unit 100. This point was then backed up an 80 per cent learning curve to arrive at projected hours for the first unit. Using learning curve formulae, the average quotation hours for 50 units amounted to 125 hours per Unit.

These calculations can be summarized as follows (Exhibit 1):

1. Projected hours at Unit 100 = $\frac{\text{Standard hours}}{\%\text{Realization}} = \frac{35}{55} = 63.6$ Production hours
   Plus 10% Insp. — 6.4
   70.0

2. Unit hours at Unit 1 = $\frac{\text{Unit hours at Unit 100}}{\text{Unit value at 100 for an 80\% curve}} = \frac{70}{.226} = 310$

3. Average hours per unit for 50 units = $\frac{\text{Unit hours at Unit 1} \times \text{Cumulative factor for 50 Units on 80\% learning curve}}{50}$

or average unit hours $= \frac{310 \times 20.12}{50} = 125$ hours per unit.

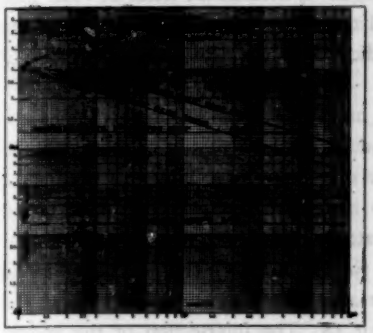

EXHIBIT 1

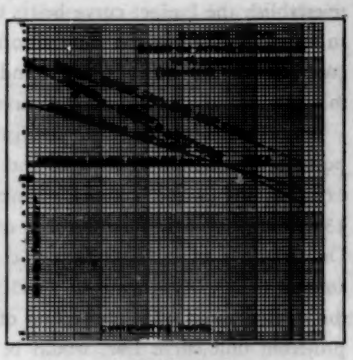

EXHIBIT 2

Management may decide to establish the 125 hour Unit average as shop budget or, if it is felt that a tighter budget should be set for incentive purposes, adjustments may be made to these hours. Once the budget hours are established, the learning curve may be used to calculate budget hours by Unit for presentation to shop personnel. In the shop, the budget is allocated by division or department on the basis of manpower requirements, the detail of which will be discussed (in the following pages).

As soon as one or more Units of the contract have been completed, it is necessary to re-evaluate the quote curve with respect to slope and position on the graph. In the example, the actual hours for the first eight units were as follows:

Unit No.	*Actual Hours*	*Unit No.*	*Actual Hours*
1	550.0	5	245.0
2	350.0	6	210.0
3	315.0	7	215.0
4	280.0	8	190.0

The actual hours indicate either that the task, i.e. standard hours, was underestimated or that the shop may not be able to achieve the required performance. The slope of the actual experience indicates a 70 percent curve to be a better approximation of shop performance when plotted on a graph.

While the shop required more hours to make the first units than anticipated, the rate of improvement indicates that better realization will be attained by the end of the contract than the original quote curve. In this case, however, the

higher rate of improvement is not enough to offset the excessive hours for the first units on an overall contract basis. It may be management's decision to re-establish the budget curve hours to the newly established trend or even less, in an effort to make the shop absorb all the excessive hours by the end of the contract. In the example, the trend indicated by the actual experience would then establish the revised budget curve.

Once the budget curve is established, management can be provided with important information relative to the financial outcome of the contract. In the example, the budget cumulative average unit hour curve intersects unit 50 at 135 hours per unit (Exhibit 2), or 10 hours per unit over the quote hours. On the basis of a $6.90 factory cost rate per hour, the loss of profit would amount to $69.00 per unit or $3,450.00 for the contract. The first unit to make the quoted profit, the intersection of the average unit quote hour line with the projected unit curve line, would be Unit 18. The intersection of the budget cumulative average unit curve line with the average unit quote hour line indicates that the total order quantity would have to be increased to 59 units in order to make quotation profit on a contract basis. Frequently management wants to know the first unit to break even on the unit price. The break-even hours can be calculated as follows:

Unit Selling price	$1,674.75	Unit hours to break even at the gross line ($1,087.25 divided by $6.90 rate per hr.)	157.6
Less: Mtl. outside production	587.50		
Dollars available for Labor, Burden, Eng., Etc.	$1,087.25		

In the event that the break-even hours at the net line are desired, the dollars available for labor, burden, etc. of $1,087.25 would be divided by a total cost rate of $7.25 per hour for a break even of 145.4 hours per unit.

Referring again to Exhibit 2, the first unit to break even at the gross line is Unit 12 and the first unit to break even at the net line would be Unit 14. Frequently, it is desirable to make break-even analyses with learning curves on the basis of sales versus cost dollars (Exhibit 3). This is done graphically by indicating material and outside production as fixed expense, and multiplying the unit hours at various points on the learning curve by the factory cost or total cost rate per hour.

In the example, the sales dollars do not offset the factory cost dollars until Unit 34. It is important to note that the unit factory cost curve would not be a 70 percent learning curve if the actual slope were to be measured. It is closer to being a 76 percent learning rate. The curve decreased in slope in conversion from hours to dollars, due to the addition of material and outside production

as a constant. In actual practice, material does follow a curve to some extent, due to improved usage of material, reduction of scrap, and outside production costs decrease due to vendor improvement. However, to simplify calculations this is generally not taken into account.

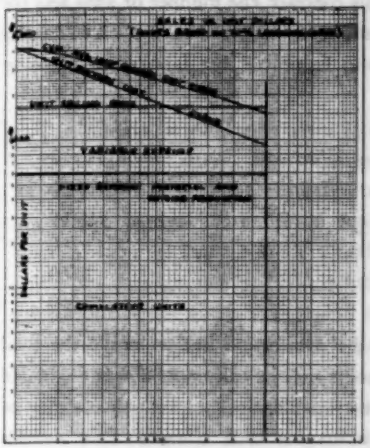

EXHIBIT 3

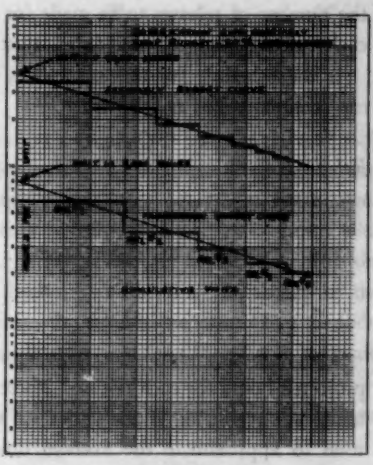

EXHIBIT 4

For Arriving at Manpower Requirements

Once a shop budget curve has been established by management, it is necessary to determine the manpower required to maintain the proposed production schedules. The following information is needed to make this analysis:

1. Shop budget learning curve.
2. Releasing policy for details and lot-ordered sub-assemblies.
3. Delivery schedule for shipment of end item.

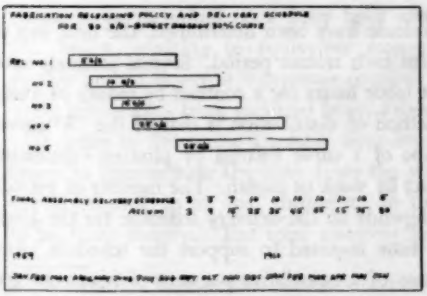

EXHIBIT 5

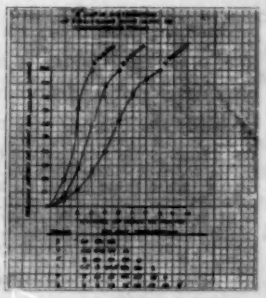

EXHIBIT 6

This procedure may best be illustrated by an example (Exhibit 4). Assume an 80 percent assembly budget curve with a Unit 1 of 40,000 hours, and an 80 percent fabrication budget curve with Unit 1 at 8,000 hours. If the total order quantity is 80 units, the first step is to determine, from the fabrication releasing policy, the number of releases to be made for this contract, the number of ship sets for each release, and the scheduled start and completion date for each release.

If the Schedule for this contract is as in Exhibit 5, the fabrication releasing can be summarized as follows:

	Quantity	*Release period*	
Release No.	*to be released*	*Start date*	*Completion date*
1	5S/S	4/59	8/59
2	10S/S	5/59	10/59
3	15S/S	6/59	11/59
4	25S/S	7/59	1/60
5	25S/S	9/59	3/60

The next step is to determine from the fabrication budget curve the total projected hours for each release. These hours may be calculated if learning curve tables are available. If the tables are not available, the midpoint theory may be used to approximate the average unit hours for each release. This assumes that the numerical midpoint of a given quantity divides the area above and below the curve equally. Applying this principle to the fabrication budget curve in Exhibit 5, the hours would be allocated as follows:

Release no.	*Midpoint (cum. unit)*	*Unit hrs. at midpoint*	*Total release hours*
1	2.5	5,900 X 5	29,500
2	10.0	3,775 X 10	37,750
3	22.5	2,900 X 15	43,500
4	42.5	2,350 X 25	58,750
5	67.5	2,040 X 25	51,000

Once the total hours for each release have been determined, the next step is to allocate these hours by month for each release period. Several methods have been developed to distribute direct labor hours for a contract by month or week. Probably the most widely used method of distribution is that of the "S" curve. Its name is derived from the shape of a curve formed by plotting cumulative direct labor hour input to a contract by week or month. The number of periods over which this curve is formed depends on the delivery schedule for the given contract and the amount of lead time required to support the schedule. Any "S" curve can be expressed in terms of a cumulative per cent of hours charged monthly to the total contract hours. Thus, in the following example:

Month of production	*Actual Direct Labor hours charged per month*	*% of monthly hours to total hours*	*Cumulative % to total*
1	2,360	8	8
2	5,900	20	28
3	9,145	31	59
4	8,850	30	89
5	3,245	11	100
	29,500	100	

The cumulative per cents, when plotted on a graph, will take the characteristic shape of an "S" curve. Many companies have analyzed their direct labor hour experience in this manner and have compiled tables of percentage breakdowns for various periods. In Exhibit 6, a portion of one of these tables is shown with periods varying from 3 to 8 months. The percentage distributions for the three, six and ten month periods have been plotted so that the shapes of the curves can be seen. As one would expect, the greater the number of periods, the more gradual the direct labor hour acceleration required in order to maintain production schedules.

The tables shown on Exhibit 6 were used to break down fabrication release hours by month in the following manner:

	PRODUCTION MONTH					
	April	*May*	*June*	*July*	*August*	*Total*
Percent distribution from "S" curve table (5 month period)	8	20	31	30	11	100%
Direct labor hours* Breakdown by month*	2,360	5,900	9,145	8,850	3,245	29,500

Once the hours for each release have been distributed by month according to period of manufacture, the total fabrication hours per month can be converted to manpower required on a forty hour week basis, by dividing total hours by 172 hours, resulting in equivalent men required per month. This may be further broken down to manpower required for each fabricating department, by using percentages from standard hours (Exhibit 7).

In order to determine assembly hour input by month (Exhibit 8), it is necessary to approximate the time from the start of the smallest sub-assembly for any given unit up to final shipment. In the example, this time was estimated to be three months. The total assembly hours for each month's shipments is

* Release No. 1. The same calculation was made for the subsequent releases according to the number of months involved.

DETAIL AND LOT ORDERED ASSEMBLY
INPUT BY MONTH ON THE "S" CURVE
WITH CONVERSION TO MANPOWER REQUIREMENTS

Month	Rel # 1	Rel # 2	Rel # 3	Rel # 4	Rel # 5	Tot. Fab. Hrs./Month	Manpower Required (172 Hr/Mo)
Jan							
Feb							
Mar							
Apr	2,360.					2,360.	14
May	5,900.	2,453.8				8,353.8	49
Jun	9,145.	4,907.5	2,827.5			16,880.	98
Jul	8,850.	7,738.7	5,655.	2,937.5		25,181.2	146
Aug	3,245.	12,080.	8,917.5	5,875.		30,117.5	175
Sep		7,550.	13,920.	8,812.5	2,550.	32,832.5	191
Oct		3,020.	8,700.	12,925.	5,100.	29,745.	173
Nov			3,480.	15,862.5	7,650.	26,992.5	157
Dec				8,812.5	11,220.	20,032.5	117
Jan				3,525.	13,770.	17,295.	101
Feb					7,650.	7,650.	44
Mar					3,060.	3,060.	18
Apr							
May							
Jun							
	29,500.	37,750.	43,500.	58,750.	51,000.	220,500.	

EXHIBIT 7

arrived at by using midpoints on the assembly curve, following the same procedure as was used for fabrication. The hours for each month are then distributed over the three-month period using the "S" curve distribution.

This type of analysis provides management with a monthly forecast of direct labor hours for the entire contract and a manpower requirement for each month of manufacture in order to maintain proposed production schedules. The procedure in the example is simplified for brevity of explanation. In practice, provision should be made for spare parts, multi-shift operations, absenteeism, re-work and any major design changes that would require substantial work in addition to the basic task.

For Evaluation of Inventory in Process

The forecasting of inventory in process (Exhibit 9) is one of the most important uses of the learning curve, as viewed by the financial division of any company. One of the main considerations in bidding on a contract for any type of manufacturing is whether the company can finance the work-in-process required to meet the proposed delivery schedules. In recent years, the availability of progress payments on military contracts has enabled many companies to carry inventories for contracts which they might otherwise be unable to accept. Prog-

ress payments, i.e., partial billings, provide for monthly payments amounting to a percentage of the total cost input for any given month. There is usually a limitation of the aggregate progress payment amount based on a percentage of the contract price. Even though progress payments may be available for a given contract, a portion of the inventory must still be financed by the manufacturer until the date of final settlement. Thus, inventory evaluation is essential for financing, whether the contract be military or commercial.

ASSEMBLY HOUR INPUT BY MONTH AND MANPOWER REQUIREMENTS
(Hours for sched. monthly shipments spread on 3-month cycle)
20% 52% 28%

Sched Ship Ship Mnth	3 Sep	5 Oct	7 Nov	10 Dec	10 Jan	10 Feb	10 Mar	10 Apr	10 May	5 Jun	Tot. Assy Hrs/ Mo	Man-Power Req'd (172 Hr/ Mo)
Jun											21,111	122
Jul	21,000										78,100	454
Aug	54,600	23,500									116,400	677
Sep	29,400	61,100	25,900								131,040	762
Oct		32,980	67,340	30,860							143,540	835
Nov			36,260	80,080	27,200						138,640	806
Dec				43,120	70,720	24,800					125,560	730
Jan					38,080	64,480	23,000				116,320	676
Feb						34,720	59,800	21,800			109,480	637
Mar							32,200	56,680	20,600		94,080	547
Apr								30,520	53,560	10,000	54,840	319
May									28,840	26,000	14,000	81
Jun										14,000	1,143,000	
	105,000	117,580	129,500	154,060	136,000	124,000	115,000	109,000	103,000	50,000		

	Fabrication Hours	Assembly Hours	Total Hours	Manpower Req. Fabrication	Manpower Req. Assembly	Total Manpower Required
Apr	2,360.		2,360	14		14
May	8,353.8		8,353.8	49		49
Jun	16,880.		16,880	98		98
Jul	25,181.2	21,000.	46,181.2	146	122	268
Aug	30,117.5	78,100.	108,217.5	175	454	629
Sep	32,832.5	116,400.	149,232.5	191	677	868
Oct	29,745.	131,040.	160,785	173	762	935
Nov	26,992.5	143,540.	170,532.5	157	835	992
Dec	20,032.5	138,640.	158,672.5	117	806	923
Jan	17,295.	125,560.	142,855	101	730	831
Feb	7,650.	116,320.	123,970	44	676	720
Mar	3,060.	109,480.	112,540	18	637	655
Apr		94,080.	94,080		547	547
May		54,840.	54,840		319	319
Jun		14,000	14,000		81	81
	220,500	1,143,000	1,363,500			

EXHIBIT 8

The first step in evaluation of inventory-in-process is to obtain the forecast direct labor hours per month for a given contract. This is readily available from the manpower requirements calculation previously discussed. Using the hours previously developed in the manpower requirements calculations, with the following quotation price break-down, the monthly inventory can be calculated for this example:

		Per unit	Total contract
Fabrication hours		2,756.3	220,500.0
Assembly hours		14,287.5	1,143,000.0
Total direct labor hours		17,043.8	1,363,500.0
Direct labor amount	$2.50	$ 42,609.50	$ 3,408,760.00
Factory burden	3.50	59,653.30	4,772,264.00
Direct material & outside production		20,000.00	1,600,000.00
Eng. Tool Maintenance	.90	15,339.08	1,227,126.00
Factory cost	$6.90	137,601.88	11,008,150.00
Selling & admin. exp.		6,880.09	550,407.20
Total cost		$144,481.97	$11,555,557.20
Profit		14,448.20	1,155,855.72
Unit selling price		$158,930.17	$12,714,412.92

The first column, indicating the forecast direct labor by month, is taken from the summary on Exhibit 8. These hours are then extended by a factory cost rate per hour of $6.90, as shown in the second column. Material and outside production in the third column are allocated by month on the same basis as for fabrication hours. Some adjustment is made to the allocation for equipment items, i.e., assembly materials which continue to be charged to work-in-process up through the last month of shipment. Column 4 represents total charges to production work-in-process for each month. We can then determine the inventories if we apply the familiar accounting principle that total input, less cost of sales, equals inventory. The cost of sales, as shown in Column 5, is determined for each month by multiplying the average unit factory cost times the number of scheduled shipments for the month. The difference between

CALCULATION OF INVENTORY IN PROCESS

BY CONVERSION OF MANPOWER FORECAST TO FACTORY COST DOLLARS

Mfg. Month	(1) Hrs. Per Month	(2) X Fact. Cost B/H $6.90	(3) Add Mtl & O. P.	(4) Total Factory Cost/Month	(5) Less Cost/Sales	(6) Monthly Inventory In Process	(7) Accum Inventory In Process
Apr '59	2,360.	$ 16,284.00	$ 16,000.00	$ 32,284.00	-	$ 32,284.00	$ 32,284.00
May	8,353.8	57,641.22	64,000.00	121,641.22	-	121,641.22	153,925.22
Jun	16,880.	116,472.00	128,000.00	244,472.00	-	244,472.00	398,397.22
Jul	46,101.2	318,650.28	176,000.00	494,650.28	-	494,650.28	893,047.50
Aug	108,217.5	746,700.75	224,000.00	970,700.75	-	970,700.75	1,863,748.25
Sep	140,232.5	1,029,704.25	240,000.00	1,269,704.25	412,805.63	856,898.62	2,720,646.87
Oct	160,785.0	1,109,416.50	224,000.00	1,333,416.50	688,009.38	645,407.12	3,366,053.99
Nov	170,532.5	1,176,674.25	192,000.00	1,368,674.25	963,213.13	405,461.12	3,771,515.13
Dec	158,672.5	1,094,840.25	128,000.00	1,222,840.25	1,376,018.75	(153,178.50)	3,618,336.61
Jan '60	142,858.	985,699.50	64,000.00	1,049,699.50	1,376,018.75	(326,319.25)	3,292,017.36
Feb	123,970.	855,393.00	48,000.00	903,393.00	1,376,018.75	(472,625.75)	2,819,391.61
Mar	112,540.	776,526.00	32,000.00	808,526.00	1,376,018.75	(567,492.75)	2,251,898.86
Apr	94,080.	649,152.00	32,000.00	681,152.00	1,376,018.75	(694,866.75)	1,557,032.11
May	54,840.	378,396.00	16,000.00	394,396.00	1,376,018.75	(981,622.75)	575,409.36
Jun	16,000.	96,600.00	16,000.00	112,600.00	688,009.36	(575,409.36)	-
	1,361,500	$9,400,150.00	$1,600,000.00	$11,008,150.00	$11,008,150.00		

EXHIBIT 9

Columns 4 and 5 then represents the monthly inventory-in-process, as shown in Column 6, and the accumulative inventory-in-process in Column 7.

This calculation of inventory-in-process can be used to great advantage in the financing of a contract. In the example, an inventory buildup prior to shipment of the first unit is $1,863,748.25 or approximately 17 per cent of the total cost to be incurred on the contract. On a commercial contract basis, all of this money would have to be financed by the manufacturer. If this contract were subject to progress payments, the manufacturer would still have to provide about $600,000.00 (assuming a partial billing allowance of 70 per cent). The maximum inventory to be provided for of $3,771,515.11 occurs when approximately 20 per cent of the contract has been shipped. The value of this type of analysis is entirely dependent on the accuracy of the basic learning curve. If the projection is too optimistic, the inventories will be understated and the converse, of course, is also true.

This is a general approach to the evaluation of inventory for a proposed contract and, no doubt, can be refined substantially to fit the needs of each product line and manufacturer as well.

This article was written for the purpose of illustrating a few of the many specialized uses of the learning curve available to the accountant. The application to budget analysis, profit measurement, manloading and inventory evaluation are perhaps some of the more important uses. The fact that a company uses these and other learning curve techniques to the best advantage should surely be reflected in its profit and loss statements.

Human Relations in System Changes

by ABNER W. BOYD*

WHEN WE SPEAK of human relations in systems and procedures changes, we are speaking of something both intangible and difficult to define. We can lay down no specific rules to follow, since human relations are a result of dealing with people and no two people are alike. Rules that prove successful with one person may have the opposite effect with another. Human relations is a vital aspect of any change and must be given serious consideration if the proposed change is to be successful. While we cannot lay down any specific rules, we do have certain basic principles which can aid

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materially in promoting better human relations in our businesses.

The success of any proposed system or procedure change depends largely on the acceptance of the revised method by the people responsible for its operation. This acceptance must be at all levels—management, supervisory, and clerical—if the new system is to function with maximum efficiency. The clerks who operate the system can often make or break it. If they like it, it will work properly; if not, they will sometimes find ways to make sure that it does not work properly. "Selling" a proposed change is as important as developing the new system in the first place, and it must be sold, not forced, to be successful. It must be accepted.

How do we obtain this acceptance? First by having the whole-hearted backing of management in the initial stages of the project. It is amazing how attitudes and opinions flow downward through an organization. If management and supervisors are enthusiastic about a project, this attitude will be reflected down to the clerical level and the door is wide open for any reasonable proposal. If the reverse is true, the person making the study might as well forget the whole thing unless he is willing to fight an uphill battle.

A second matter of importance in gaining acceptance of a new procedure is to be as open and above-board about the whole matter as we can possibly be. Being overly secretive is an excellent means of arousing suspicion and resentment. We explain what we are doing and why. We are very careful to explain that we are attempting to eliminate or simplify the routine part of the work so that more time will be available for more important work. This generally allays any fears that the person involved will lose his job.

The third way—and one of the most important means of maintaining good human relations and promoting acceptance of changes—is participation. We try to get all the key people who will be involved in operating the proposed system to participate in the project with us. We ask advice and opinions, even though the answers are often obvious. Once a person has ventured a suggestion or opinion, he feels he is contributing something and becomes a part of the project. I have seen resentful attitudes change instantly through the use of this little "gimmick". This method can be used to advantage even at the top levels of supervision.

As a fourth point in working on a proposed change in a system or procedure, do not criticize the present system to a member of the group responsible for operating it. You might find that the person you are talking with was the one who originally designed the system. If this happens, and I have seen it happen, you might as well forget the whole project. Also,

even though the person may not have had any part in designing the system, he has had some responsibility in operating it and may sense criticism, even though none is implied.

Fifthly, learn as much as possible about the idiosyncrasies of the person to whom the proposal will be made, especially any covering a particular phase of his operation which he might not want changed under any circumstances. We find a lot of this and always try to work around it, to leave the operation as intact as possible. I have seen otherwise excellent proposals rejected because one part of it infringed on one of these "pet peeve" areas. Try to tailor and present your proposal to match the personality traits of the individual to whom it will be presented. No two are alike and the same type of presentation may produce entirely different reactions with different people. There is no such thing as a standard presentation because there is no such thing as a standard person.

To better illustrate the point I am making here, let us take a few specific examples. One type of person may pride himself on his ability to organize his own detailed operating procedures. This type is generally difficult to talk with about a new or revised procedure. Oftentimes, the moment he grasps the idea you are trying to get across, he will grab the ball and start injecting his own ideas into the procedure. If he should go off at a tangent, you find yourself in rather an embarrassing position. It is best to present him with a detailed writeup in advance so he will have the opportunity to grasp your entire proposal before discussing it. Another type may be a fanatic on grammar and a typographical error such as a misspelled word or misplaced comma can disrupt his evaluation of your proposal. Still another may be very moody and let his mood effect his judgment. With this type it is advisable to discuss trivia, such as personal matters, particularly about his hobby, if you know about it, before presenting a new proposal. If he is not in a receptive mood, delay your presentation until a more opportune time.

We are all creatures of habit whether we like to admit it or not. While we are often perfectly willing to change these habits on our own volition, we resent anyone else trying to change them for us. In preparing your presentation, ask yourself this question—How would I react if I were in his place and someone made this proposal to me? If you have any doubts whatever, better re-work it. Remember, good human relations don't just happen; they must be engineered.

How We Achieved Ready Control of Fixed Asset Detail

by HILMER O. HAGEN

THE MAINTENANCE OF property records for a company that is geographically located in 141 cities on 4 continents presents a formidable and challenging problem. Trans World Airlines has met and overcome this problem by revising its accounting procedures and records so as to realize the maximum benefits from mechanization and simplification. The company classifies its equipment between flight and ground and, since the complexities surrounding flight equipment are somewhat different, we have restricted this paper to the handling of ground equipment and the straight-line method of depreciation. This is not meant to imply that the procedure is not adaptable to other equipment and other methods of depreciation, such as declining-balance and sum-of-the-years digits.

A Modernization Program

The program was started in January 1958. After preliminary investigation, the prime goals or objectives for the project were established as: (1) mechanical production of acquisition, retirement, and depreciation journals, (2) fully reconcilable reserve accounts and depreciation charges applicable to any desired organizational level, (3) more effective physical control of equipment, and (4) records which would permit mechanical extraction of classified data from each account. Study was begun by determining exactly what data would be necessary for effective control and what information was essential for successful management. Being a government regulated industry, it also was necessary to provide for such data as is or may be required by the Government.

Having once determined what all the necessary elements were, we set about updating and revising the records of each existing property item. This involved revising the format of present records so as to facilitate future machine processing, computing the amount of monthly depreciation, accrued depreciation, and determining the acquisition dates of over 70,000 ground equipment items alone. The only known facts contained in the existing machine records that were readily available regarding each existing item were the description, the date it

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HILMER O. HAGEN, Kansas City Chapter, 1956, is Finance Systems Specialist for Trans World Airlines, Inc. He joined TWA in 1945 as a Cost Accountant, and has since held supervisory positions in General Accounting, Budget Administration, and Special Studies, before being assigned his present position.

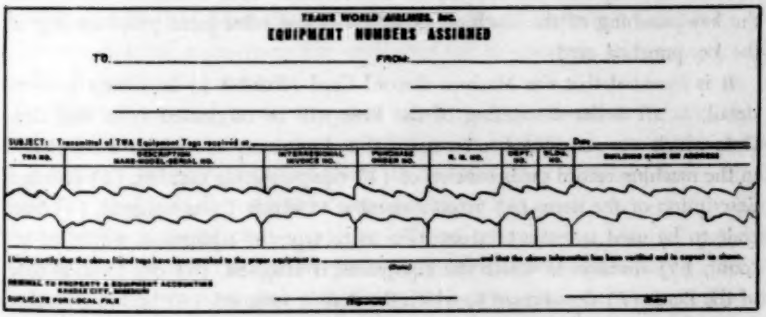
would become full depreciated, and the acquisition cost. Due to the volume of items involved, it was quite obvious that only by utilizing mechanical processing techniques could a practical conversion of existing records be made. This was accomplished by programming the operation on an IBM 650 Computer. Approximately twelve hours of machine time was required for this operation.

Once the existing records were updated, it was then possible to fully reconcile the reserve accounts by individual item and realize the first benefits of the new procedure. Working with the new updated machine property record cards, later considered in more detail, fully depreciated items were sorted out and the dollar amounts in the remaining cards were summarized by account, department and location. The summary cards in the same form as the item cards, developed through this process, could be referred to as control cards, balance forward or property summary cards. We use the term property summary cards. By summarizing in this manner, the volume of cards required to produce depreciation charges by department and location is reduced from over 70,000 to 5,000. This number can be further reduced if depreciation charges are confined to the corporate level.

Equipment Numbering; Property Record Cards

The processing of current activity was next begun according to new procedures now to be described. Upon receipt of basic documents necessary to support capitalization, such as invoices representing direct purchases of equipment or other cost media representing an accumulated cost of a project or work order, the documents are matched with a weekly report submitted by departments receiving equipment and giving the tag number assigned to the unit (Exhibit 1).

After matching the equipment tag number from the equipment numbers



TRANS WORLD AIRLINES, Inc.

EQUIPMENT NUMBERS ASSIGNED

TO: _____ FROM: _____

SUBJECT: Transmittal of TWA Equipment Tags received on _____ Date _____

TWA NO.	DESCRIPTION MAKE-MODEL-SERIAL NO.	INTERNATIONAL INVOICE NO.	PURCHASE ORDER NO.	R. R. NO.	DEPT. NO.	W.O. NO.	BUILDING NAME OR ADDRESS

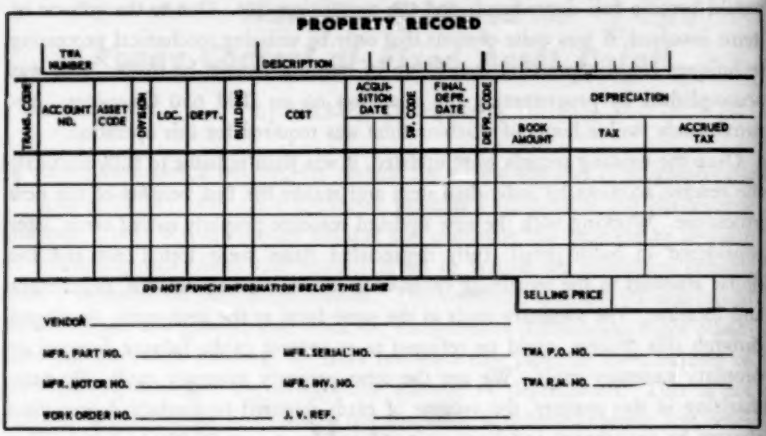
I hereby certify that the above listed tags have been attached to the proper equipment on _____ (Date) and that the above information has been verified and is correct as shown.

REMAIL TO PROPERTY & EQUIPMENT ACCOUNTING KANSAS CITY, MISSOURI

DUPLICATE FOR LOCAL FILE

_____ (Signature) _____ (Date)

EXHIBIT 1


PROPERTY RECORD

TVA NUMBER

DESCRIPTION

TRANS. CODE	ACCOUNT NO.	ASSET CODE	DIVISION	LOC.	DEPT.	BUILDING	COST	ACQUISITION DATE	SH. CODE	FINAL DEPR. DATE	DEPR. CODE	DEPRECIATION		
												BOOK AMOUNT	TAX	ACCRUED TAX

DO NOT PUNCH INFORMATION BELOW THIS LINE

SELLING PRICE

VENDOR

MFR. PART NO. MFR. SERIAL NO. TVA P.O. NO.

MFR. MOTOR NO. MFR. INV. NO. TVA R.R. NO.

WORK ORDER NO. J. V. REF.

EXHIBIT 2

assigned report and the applicable costs, a property record card (Exhibit 2) is then originated for each item. This card is complete in every detail in that it contains and reflects all pertinent data surrounding the item. Since the card becomes the source document from which machine records are originated, considerable time and care was given to its design, layout and content. Although machine records which have been mentioned do not contain all the data in the property record card, they do contain that information which is necessary to achieve by mechanical processes. Property record cards, as an example, contain historical data, such as vendor, manufacturer's part number, purchase order number, etc., which, although pertinent to the item itself, have little but reference value when connected with the accounting functions. Layout of the property record card is in the same sequence as the machine record card. This was done to facilitate the key-punching of the machine record cards and subsequent proof reading of the key-punched card.

It is essential that the Machine Record Card (Exhibit 3) be correct in every detail, as all dollar accounting of the item will be originated from that card. Data which was considered to be essential and necessary and which was included in the machine record cards consists of (1) equipment tag number, (2) standard description of the item, (3) account number to which it was assigned, (4) asset code to be used to extract information as to types of equipment within an account, (5) division to which the equipment is assigned, (6) city location code of the item, (7) department to which the item is assigned, (8) building number in which the equipment is to be located, (9) total acquisition or applicable cost,

(10) acquisition date, (11) date the item becomes fully depreciated, and (12) amount of monthly depreciation. By including all of the foregoing data, we not only provide all the basis for dollar accounting but can also physically locate and control equipment by type, division, city and building. The latter, as an example, is important information for insurance purposes when you consider the fact that equipment is frequently transferred between buildings, cities, states, and countries.

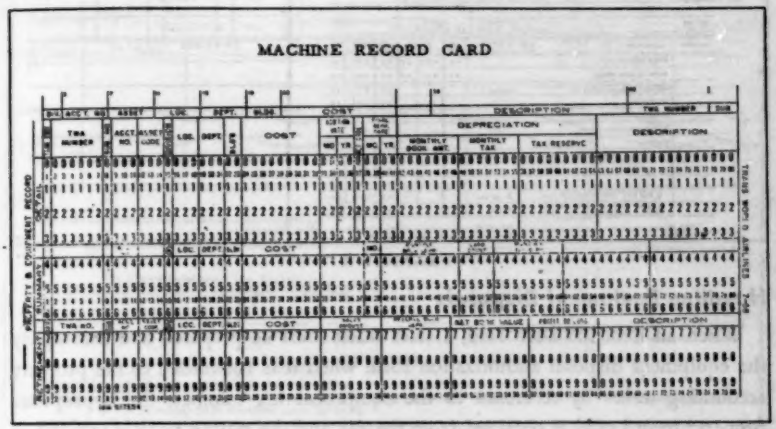
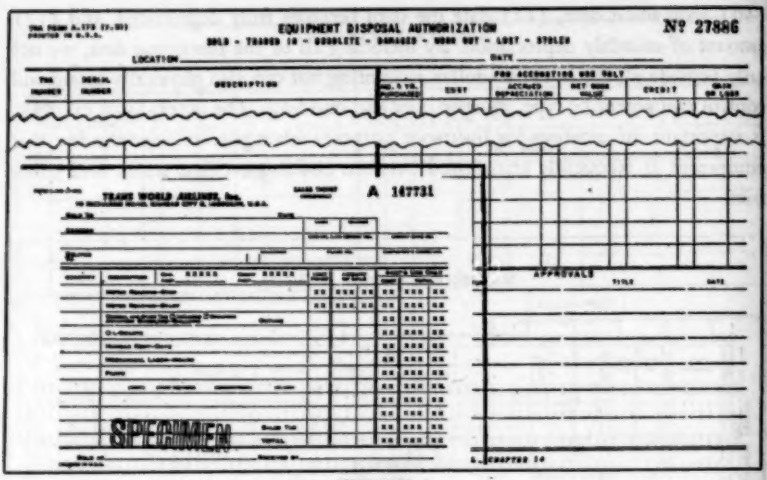


EXHIBIT 3

When a predetermined number of property record cards have been originated within a given month, they are batched for processing control and forwarded to the key-punch unit where the machine property record cards are originated by key-punching all the essential data from the property record card. As noted before, the format of the machine card was designed so that it could be used not only as a detail card but also as a summary card and, likewise, a retirement card. It also contains a provision for accelerated tax depreciation in event such data differs from booked amounts.

The key-punched cards are proof-listed on a tabulator and the listing is returned to property accounting unit for proof reading, along with the source documents, the property record cards. In this manner, a machine property record card is originated for each item acquired during the accounting period and is a counterpart to the property record card. When an equipment item is disposed of, either through sale, trade or scrap, an equipment disposal authorization (Exhibit 4), properly approved and authorizing the action, must be originated by the department or section disposing of the item.


EQUIPMENT DISPOSAL AUTHORIZATION

Nº 27886

SOLD - TRADED IN - OBSOLETE - DAMAGED - WORN OUT - LOST - STOLEN

LOCATION _____ DATE _____

TAG NUMBER	SERIAL NUMBER	DESCRIPTION	NO. YRS. PURCHASED	COST	FOR ACCOUNTING USE ONLY ACCRUED DEPRECIATION	NET BOOK VALUE	CREDIT	GAIN OR LOSS

TRANS WORLD AIRLINES, Inc.

A 187731

APPROVALS

TITLE DATE

SPECIMEN

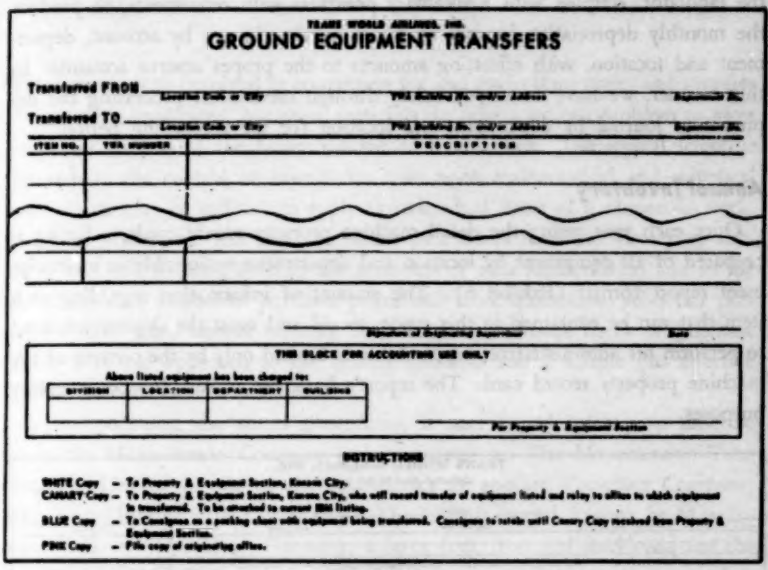
EXHIBIT 4

Handling Equipment Disposals

When an item has been sold, a sales ticket must be prepared and accompany the equipment disposal authorization form when it is forwarded to the property accounting unit. By reference to the equipment tag number, the appropriate property record card is obtained from the file and the selling price is inserted in the space provided on the card. Cards representing items sold are assigned a different transaction code than normal retirements. This is done as a means of identification in future processing. The property record cards are batched and forwarded to the data processing unit where the corresponding machine property record card is removed from the file. When an accumulation of cards has been removed from the file and sale amounts have been punched into the cards, they are proof listed and the listing, along with the property record cards, is returned to the property accounting unit for verification.

The machine property record cards representing both retirement and sales are accumulated throughout the accounting period and then processed through the computer to develop the amount of accrued depreciation and the net book value of each item. Next they are processed through a tabulator coupled with a summary punch. Through the use of transaction codes, with this operation, we are able to summarize into journal entries the applicable dollar amounts and to select the proper reserve, property and non-operating accounts to be credited and debited, as the case may be. In this manner, we have not only calculated the amount of the accounting entries by mechanical means but also selected the

applicable accounts and punched both accounts and amounts into journal cards. Thus, through a single, relatively simple operation requiring approximately two hours processing time, we have produced our retirement journalization for the accounting period.



TRANS WORLD AIRLINES, INC.

GROUND EQUIPMENT TRANSFERS

Transferred FROM _____ Location Code or City _____ TWA Building No. and/or Address _____ Department No.

Transferred TO _____ Location Code or City _____ TWA Building No. and/or Address _____ Department No.

ITEM NO.	TOA NUMBER	DESCRIPTION

_____ Signature of Originating Supervisor _____ Date

THIS BLOCK FOR ACCOUNTING USE ONLY

Above listed equipment has been charged to:

DIVISION	LOCATION	DEPARTMENT	BUILDING

_____ Per Property & Equipment Section

INSTRUCTIONS

WHITE Copy – To Property & Equipment Section, Kansas City.

CANARY Copy – To Property & Equipment Section, Kansas City, who will record transfer of equipment listed and relay to office to which equipment is transferred. To be attached to current IBM listing.

BLUE Copy – To Consignee as a packing sheet with equipment being transferred. Consignee to retain until Canary Copy received from Property & Equipment Section.

PINK Copy – File copy of originating office.

EXHIBIT 5

When responsibility for an equipment item transfers from one department to another or when the physical location of an item changes, the department transferring or relocating the equipment is responsible for originating an equipment transfer form, which is forwarded to the property accounting unit for verification of the original assignment of the equipment. This form is illustrated in Exhibit 5. Data pertaining to the current assignment is inserted in the space provided on the form. The forms are then batched, posted to a processing control and forwarded to the data processing unit where the applicable machine property record cards are removed from the file. A new card, reflecting the new department, location, etc., is originated for each item and proof-listed. The proof listing and the equipment transfer form are returned to the property accounting unit for verification. The proof listings and forms are retained and serve as a basis for reporting transfers of the equipment to meet insurance requirements.

Once each month, the detail file of machine property record cards is purged

to remove all items becoming fully depreciated that month. These cards, together with current activity cards, acquisition, retirements and transfers are used to update and bring to a current status the summary property record cards. After this has been accomplished, the updated summary cards are processed through the tabulator, coupled with a summary punch as with retirements, to produce the monthly depreciation journal by punching the charges by account, department and location, with offsetting amounts to the proper reserve accounts. In this manner, we have developed solely through mechanical processing the depreciation journal by department and location for the accounting period.

Annual Inventory

Once each year, using the detail machine property record cards, a listing is prepared of all equipment by location and department responsible in an equipment report format (Exhibit 6). The amount of information regarding each item that can be contained in this report to aid and assist the department head to perform his administrative responsibility is limited only by the content of the machine property record card. The report's basic use is for physical inventory purposes.

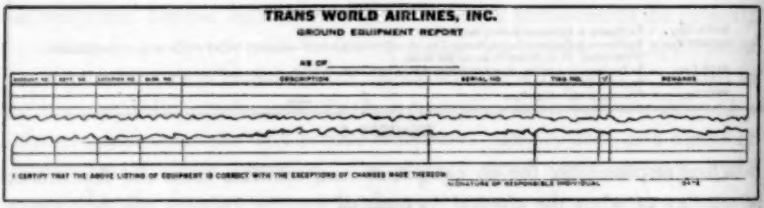

TRANS WORLD AIRLINES, INC.
GROUND EQUIPMENT REPORT
AS OF _____
DESCRIPTION | SERIAL NO. | TAG NO. | REMARKS
I CERTIFY THAT THE ABOVE LISTING OF EQUIPMENT IS CORRECT WITH THE EXCEPTIONS OF CHANGES MADE THEREON.
SIGNATURE OF RESPONSIBLE INDIVIDUAL

EXHIBIT 6

Additional Potential

The revised procedures were placed into effect in July of 1958 and, although pleased with the results, we are cognizant of the fact that a procedure can always be improved. We immediately made plans to further improve and mechanize them. Specifically, it is planned to explore the possibility of using pre-punched cards to eliminate all manual processing necessary to effect departmental and location transfers and to incorporate the pre-assignment of equipment tag numbers. In addition to accomplishing the goals which were established in the beginning, revising our depreciation procedures has enabled us to produce our monthly property accounting in two or three days less time and at less cost than in the past. The procedure also has the capacity to expand and absorb large volumes of activity and dollars with little or no additional burden.

Control Accounting For Plant Stores and Supplies

by JOHN T. DIXON

THE PRINCIPLES involved in accounting for and controlling stores and supplies are not complicated, but these materials do pose a serious problem to most companies because of the heavy volume of transactions. The typical scientific approach to the control of inventories rests upon mathematical and statistical bases which may be difficult to apply to individual items of a numerous stock. At Mannesmann, we feel that our stores procedures have the virtues of simplicity and effectiveness, both in the processes of data accumulation and in the use of the data to control purchase prices and stock quantities. Also our procedures have some unique features, including an automatic check of purchase prices, a simple approach to the pricing problem and a simple but effective formula to control stores quantities.

Before outlining the stores procedures, it may be of interest to describe briefly the Mannesmann Company and its operations. The Mannesmann Tube Company Limited is one of the subsidiaries of another Canadian Company, Mannesman International Corporation. The latter is owned, in turn, by Mannesmann A.G. of Düsseldorf, Germany, a large coal, iron and steel company the founders of which invented the "Mannesmann process" for rolling seamless tubes in 1886. The Canadian company operates a seamless tube mill in Sault Ste. Marie, Ontario, manufacturing steel pipes for the Canadian oil industry in diameter ranges from 4½" to 10¾". The mill, which commenced operations in June 1957, is extensively automated and is considered to be the most modern of its kind in the world. Built at a cost in excess of $20 million, the mill has an annual rated capacity of over 200,000 tons of oil-well casing and line pipe. The plant employs approximately 500 people.

The main purpose of this article is to describe the company's special control features in the area of stores and supplies. The accounting systems as such are outlined only in sufficient detail to provide a background for discussion of the control techniques.

JOHN T. DIXON, CPA (Ontario), is Assistant Comptroller, Mannesmann Tube Company Ltd., Sault Ste. Marie, Ontario, Canada. Prior to his present affiliation, Mr. Dixon was Financial Analyst at Ford Motor Company of Canada. He is a graduate of Business Administration from University of Western Ontario.

The mill stores consist of four main categories: mechanical spare parts, electrical spare parts, electrical supplies and general mill stores. At the moment, the inventory consists of approximately 8,000 items, costing just over one million dollars. The control features are discussed under the following headings:

1. Requisitioning
2. Accounting procedures
3. Use of the standard price and the variance analysis

Requisitioning

Before discussing the order pattern, it must be pointed out that we use an automatic re-ordering system. The re-order procedure commences when stock reaches an assigned minimum quantity. No quantitative appraisal is made when re-ordering. Thus it is most important to establish proper minimum, maximum and order quantities in the first instance. Once an item is "set up" in stores, it continues to fluctuate within the assigned minimum and maximum quantities until these are changed by the appraisal of inventory quantities.

A new stores item is set up when the need is recognized to have the material available on short notice. The new item may be set up for a number of reasons, for example, a new machine may be ordered and a complement of spare parts ordered at the same time or—as happens more frequently in a new mill—routine maintenance and repairs disclose requirements for materials which are not in stores. In any event, when the need for a new stores item is recognized, the department requiring the material makes up a purchase requisition giving all the data necessary so that the stores department can catalogue the item and the purchasing department can prepare a purchase order.

The purchase requisition form is first routed to the stores department where it is checked to make sure the item is not already in stock and that it is a proper stores item from the point of view of space limitations, safety, etc. If the item is accepted, the stores department completes an item description card assigning a stock number and a catalogue description. The card is sent to the tabulating department where a catalogue card is prepared.

At this point, the first quantitative control is introduced. The originator is required to record on the purchase requisition form an estimate of annual consumption and suggested minimum and maximum quantities. The stores department then calculates minimum, maximum and re-order quantities for use in the automatic re-ordering system, using the formula shown below (with a sample calculation):

Annual consumption	(A)	120
Order period	(B)	2 Months
Consumption during order period	(C)	$20 \left(\frac{A}{12} \times B \right)$
Safety factor	(D)	5 (25%)
Minimum quantity	(E)	25 (C + D)
Minimum economical order quantity	(F)	10
Maximum quantity		35 (E + F)
Re-Order quantity		The larger of C or F

The formula is based on the assumption that the supply on hand should not exceed the quantity which will be consumed during the replacement period, plus a reasonable safety factor. Thus, in the above example, the initial order quantity is 35 and the re-order point is 25. When the re-order point is reached, 20 units will be ordered and, during the re-order period, 20 units will be consumed, leaving 5 on hand when the new supply is received. Of course, if the minimum economical order quantity is greater than the consumption during the order period, the former quantity will govern.

Before the calculated minimum and maximum quantities are accepted for use in the automatic re-order system, they are compared with the quantities suggested by the originator. If the differences are minor, the calculated quantities are accepted. However, major differences are queried because the originator may know of conditions not taken into account in the formula. For example, the 120 units taken in the example as annual consumption might be used 60 at a time, in which case the minimum quantity would have to be at least 60. In practice, it is found that the formula yields reasonable minima and maxima in the great majority of instances.

This calculation may seem somewhat onerous, but we feel that the control is well worth the time. Excessive inventories consume funds which could be profitably employed and the cost is compounded when storage costs are taken into consideration. By establishing reasonable stock quantities in the first instance, such wastage is prevented before it occurs. Because the calculation is made only once (later reviews are made on a turnover basis), the clerical cost is not considered excessive.

After establishment of the minimum and maximum quantities, the original of the purchase requisition form is passed to the purchasing department, where arrangements are made to purchase the material. The stores department retains a copy of the form which is used to set up the necessary cards for the automatic re-ordering system.

Accounting Procedures

As mentioned above, when the stores department processes a requisition for a new stores item, an item description card is prepared and passed to the tabulating department. After tabulating prepares the catalogue card, the item description card is sent to the accounting department where a "standard" price is assigned. This price is the estimated invoice cost, including duty if applicable but not including freight. (Freight on stores is expensed). The receipt of the material and the payment of the supplier's invoice are recorded using the tabulating facilities. The tabulating listings are the basis for the following accounting journal entries:

Dr. Stores
  Cr. Stores accrual account
  Recording receipt of stores materials at standard prices

Dr. Stores accrual account
  Cr. Accounts payable
  Recording payment for stores materials at actual prices

It will be recognized that, if the standard and actual prices were exactly the same, the debit and credit entries to the stores accrual account would balance for all items invoiced and the remainder in the account would represent the liability for stores received but not yet paid for. In fact, of course, the prices do not correspond. In order to clear the stores accrual account, leaving only a balance representing estimated liability for items not yet invoiced, two listings are prepared by the tabulating department:

1. The first listing is a tabulation of the differences between standard and actual prices for materials paid for. The accrual account must be adjusted to eliminate these differences; this adjustment is made by a journal entry the amount of which is the net total of the listing.

   Dr. (or Cr.) Price Variance—stores
   Dr. (or Cr.) Stores accrual account

2. The second listing is a tabulation of unmatched receiving reports, that is, receiving reports for which invoices have not yet been received. The total of this listing balances with the general ledger stores accrual account and represents the company's liability for stores received and not yet invoiced.

The result of these accounting procedures is to set up the stores inventories at a standard price. Stores receipts are tabulated from receiving reports as explained above. Stores issues also are tabulated and balance cards are prepared,

so that a listing can be made at any time showing complete detail of stores quantities and values.

Use of The Standard Price and the Variance Analysis

The main advantage of the standard price is that of simplicity. Systems involving averaging are time-consuming for a tabulating facility. The use of a first-in, first-out pricing principle—or its opposite, the "lifo" method—also is difficult to work with if it is desired to calculate unit amounts mechanically. A standard price, on the other hand, can be recorded on a master card and used to cost receipts, issues and inventory quantities without the need to recalculate the price itself as new stocks are received. By assigning a standard price in advance, we are able to take stores materials into the accounts immediately upon receipt. Thus our accounts are up to date and current assets and liabilities are properly stated without the need for special accruals when the accounts are closed. Also, it is possible to charge out the cost of stores materials to the various cost and asset accounts without "costing" inventories, resulting in a considerable time savings when compared with other systems.

In our system, the standard price is assigned when the material is first ordered. When payment is made for the initial order, the difference between the standard price and the actual appears as a variance in the variance listing. If the difference exceeds a predetermined level (currently $10 in total of 10 per cent, whichever is greater), the variance is analysed and the price may be changed. Incidentally, a sizeable variance does not necessarily indicate that the price is incorrect; there may be quantity differences between the receipt and the invoice and there is always the possibility of clerical errors—hence, the need for analysis. After the initial purchase, the standard price is used for material issues and also when the material is re-ordered. The variance analysis is considered an important accounting control, accomplishing the following results:

1. A management control over purchase prices. Purchase prices are not usually controlled or analysed to the same degree as are other areas of cost, even though material costs form a large percentage of most companies' total costs. At Mannesmann, we consider this a very important area of cost control. Changes to the standard prices for stores (and for several other categories of material purchases) are carefully analysed and evaluated before being passed forward for management approval.
2. A double check of the supplier's invoice. By taking up the estimated cost of stores receipts and comparing with actual, we check the work of the accounts payable staff in passing invoices.

3. A check of the accuracy of material accounting. We have found that mechanical—and therefore unthinking—data processing can lead on occasion to some rather startling inaccuracies. For example, on one occasion we purchased 25 drums of a lubricant worth $50 a drum. Each drum contained 50 gallons and the receiving clerk incorrectly showed the units in gallons—1,250 of them. The standard price calculation made by the tabulating department resulted in a charge of $62,500 to stores inventories, exactly twenty-five times too much. In the early stages of our system the variance analysis did not exist and our inventory thus became seriously overstated. From smaller errors of this sort by comparing standard costs with suppliers' invoices, it is now virtually impossible fot any major error to remain undetected past the end of the month.

The analysis of the variance report and the resulting recommendations for price changes and accounting adjustments are the responsibility of the accounting department. This work, together with the original assignment of prices for new stores items, takes one clerk approximately ten days a month.

Congratulations, Mr. Treasurer

by ALBERT S. WATSON

AMERICANS are organization happy. At the slightest provocation, groups organize themselves to get something done. A typical church will have a half-dozen organizations ranging from the Ladies' Missionary Society through youth groups and including the various Sunday school organizations. In addition, almost every American public school has its Parent-Teacher Associations. As one travels about the country, the entrance to each town is marked with the several signs of the various service organizations which meet regularly to engage in a group luncheon, a speaking program, and some service project. The nation abounds with technical societies organized to bring together people having a common occupational interest. Finally, in the last few years, the growth of co-operative associations operating country clubs, athletic clubs, swimming pools, and tennis courts has been phenomenal.

Each of these many organizations accumulates funds which require protection and someone to account for them. The funds are derived from dues and collections, billings for services rendered, and receipts from "projects". The funds thus accumulated are spent, usually with the authorization of a Board of Directors, for either services or merchandise. Again, it becomes necessary to provide a record of what has happened so that a history of the organization can be maintained and so that the activities of the person handling the funds can be verified. It is interesting to note that, of the several billion dollars embezzled annually in the United States, a certain portion of these defalcations occurs in these loosely run associations. In many cases, the association is not aware that dishonesty has occured.

The selection of the treasurer in these associations is not usually the result of a hard-fought election. In most cases, a likely suspect is drafted and the so-called election occurs when the secretary casts a unanimous ballot for a slate of officers selected by a nominating committee. The slightest show of interest on the part of an accountant who is a member of any of these associations is all that is necessary to guarantee his election. After the congratulations have been offered, the new treasurer is suddenly confronted with the fact that he is respon-

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ALBERT S. WATSON, Dayton Chapter, 1947, is Manager of Factory Accounting of the Standard Register Company, Dayton, Ohio. He has been associated with this company since 1945, having held various sales and financial positions. Mr. Watson graduated from Lehigh University holding a Bachelor's Degree in Business Administration. He is a previous contributor in the *Bulletin*.

sible for fulfilling the duties of a job which are rarely outlined and certainly not defined adequately. Fortunately, his training and background provide him with the knowledge of certain principles which should be followed and, after a period of study, he can develop the duties and functions for which he should be responsible. But the non-accountant, when he is chosen, has usually only a certain amount of willingness to make up for his lack of training in this rather bewildering activity.

This article, therefore, will be directed primarily to the non-accountant and should serve as a time saver for the accountant as well. Reference to the material which follows should provide a complete guide on the handling of these duties in the majority of the associations existing in this country today. This guide will show how the job of treasurer should be handled. It should provide a concise article to be handed to the person who seeks the help of the accountant in establishing his duties and functions and records as treasurer of an organization. It has been deliberately written in layman's language to eliminate loss of time in defining terms and explaining the difference between debits and credits to the uninitiated.

Duties of the Treasurer; Transferring the Office

There are five major classifications of duties which are common to all associations. They are as follows:

1. *The Handling of Funds*—It is a common principle that all funds of an association should be under the direction of one individual. Establishing separate responsibilities for separate funds leads to general confusion and duplication of work.

2. *Bookkeeping*—This is a horrid term to the average member of an association, but it is necessary function to provide a running history of transactions. Bookkeeping is of little value unless the results of the activity can be used as a reference for future operations.

3. *Budgeting*—Most organizations find it necessary to plan their financial transactions in a manner which will make sure of adequate funds for each portion of the year. The function of budgeting should be assumed by the treasurer of an association and his recommendation for a financial program should be presented to and approved by the board of directors.

4. *Legal Compliance*—There are Federal, state, and municipal regulations which affect the activities of associations, regardless of their size or purpose. The treasurer is responsible for seeing that the

organization does not disobey any of these laws. Depending on the size and scope of operations, items such as Federal excise tax, state unemployment compensation, city income tax, and gambling licenses may be required by an association. In the event that the treasurer is not conversant with tax laws, he should seek the help of a member of the legal profession and get immediate advice on which regulations might pertain to his association.

5. *Financial Advice*—The treasurer's outlook on matters of monetary policy should be sufficiently unbiased for him to take the best possible stand on any issues that affect the funds of his organization. It is his duty to prevent both overspending and underspending, in order to steer the organization along the paths for which it was developed.

The surest way of failing to perform the duties of treasurer properly is to get started on the wrong foot. If one treasurer retires and a newly-elected treasurer replaces him, it is necessary for certain things to be done completely in order to provide a firm basis for the activities of the new man. It is important, first, to fix a date on which the transfer is to take place. This may coincide with the annual meeting, the end of a calendar year, or the end of a fiscal month. Once the date has been selected, a bank statement should be requested which will coincide with this date.

The next step is to prepare a resolution approved by the board of directors which will authorize the change in the bank account of the association. The new signature or signatures have to be authorized and the bank has to be informed whether or not to honor checks with the old signature after a certain date.

The third step in a transfer is to verify the funds of the association. After the funds have been verified, it is necessary to see that the records or books of the association agree with the final treasurer's report of the retiring officer. Only then should the actual transfer of the files, records, and important documents occur. An additional required step is to notify all correspondents of changes in the mailing address, if any, and the names of officers to whom invoices or correspondence should be directed.

A final step in the transfer from one officer to another is the surety bonding of persons having access to funds. This is mentioned not because it is absolutely essential in the smaller association but primarily to call attention to the fact that it is sometimes desirable and should be discussed as new business in the first board of directors meeting.

Basic Accounting System

This consists of four types of records. In the smaller association, it is not necessary to complicate the treasurer's job by repetitious recording and posting operations. Therefore, the accountant will be amazed to find that no formal "books" are required. Instead, the following basic records provide a complete method of keeping track of the doings of the association related to money.

1. *A Bank Book or File of Duplicate Bank Deposit Slips*—If this is sufficiently detailed, there is no need for further records covering cash receipts. The bank deposit slips should be prepared in a manner which provides information on the source of funds instead of merely the name of the person from whom the funds were received. Classifying a listing of checks with a heading indicating the reason for the receipt will not confuse the bank and will provide a complete record in one place. For example, a deposit slip may list five checks from members covering the payment of dues. The deposit slip should therefore be headed: Dues Receipts 1960, with a listing of the names below this caption.

2. *A Checkbook*—If the checkbook provides the usual check stub, it is a matter of seconds to indicate on each check stub the reason for the disbursement. This seemingly unimportant notation is omitted on the check records of many associations and causes the loss of vital information on the classification of payments.

3. *A file of Treasurer's Reports*—If treasurer's reports are compiled monthly, this file then becomes the major historical record of the transactions of the association. The deposit receipts and the check stubs merely back up this report to provide further details concerning from whom or to whom cash flowed.

4. A final record is a file containing paid bills, the sources of receipts, a membership list, a list of the association's property, and any general correspondence.

With this basic set of records, the average P.T.A., Sunday school, social club or civic group can maintain an adequate record of all of its transactions, which can be verified and audited at any time. The lack of formal books saves the time of the treasurer by eliminating tedious bookkeeping routines. As is evident from study of this system, the key factor is the treasurer's report. This necessarily must be compiled with care and alertness so that it will provide recognizable information for future use. Recently, a cartoon appeared in one of the monthly magazines which depicted a treasurer of a women's group reading her report. It consisted of a list of ladies' names with the amount which had

been spent by each one. This could have been a funny cartoon had it not called attention to a prevalent situation which can seriously affect the success of an enterprise.

The treasurer's report should classify receipts and expenditures by type rather than by name of individual, so that the membership knows for what purpose monies were received or disbursed. This basic system can be used by an association that does not have to file tax returns, has no payroll, does not make formal billings to its members, and where the average number of deposits and the average number of checks written does not exceed 15 a month.

How the Basic System Works

Upon transfer of office, as outlined above, the most recent treasurer's report is compared with the checkbook balance. If this is found to agree, the retiring treasurer should open the bank statement and reconcile it with his checkbook in the presence of the new treasurer. At this point, it is necessary to prepare a list of all outstanding checks, which should be compared with the check stubs and the invoices supporting these payments. These invoices should bear the written approval of the board of directors or authorized officer, depending on the by-laws of the association. When these things are found to be in order, then the changes in the authorized signatures can be arranged with the bank.

In handling transactions, the receipt of cash (currency and coin) should be supported by a report from the person giving the cash to the treasurer. This might be a list of dues collected or a brief report of a collection, or the record of the sale of services or merchandise. It is important that the person handing the cash to the treasurer provide this report and that his signature or initials appear on it. The treasurer should deposit all cash in the association's bank account promptly. If checks are deposited, they should be endorsed "for deposit only" in the name of the association. A record of the deposit should be immediately placed upon the check stub to provide a running record of cash on hand.

The payment of funds for an association should be handled in a manner which provides a complete proof of the authenticity of the payment. In all cases, payments should be made by check. Each disbursement should have the written approval of the authorized officer of the association or a notation of the approval of the board obtained as a result of a meeting of the board. This can best be handled by introducing all bills and invoices as business at the board meeting, so that the secretary's minutes will indicate that the expenditure was properly approved by a majority of the board members present. This approval

should also be noted on the face of the invoice or request for payment. All checks should be signed in the name of the association, followed by the signature of the treasurer and his title. This prevents errors on the part of the bank which might confuse the personal checking account of the treasurer with the checking account for the association. It is necessary to provide a cross reference to the check number by indicating on all invoices a check number and a date of payment, so that future audits can verify that all payments were properly supported by documents from suppliers. These documents can then be filed in chronological order in a file folder.

There is one added point which should never be overlooked and that concerns the purchase of postage. This should be authorized properly and should be paid by check just as if it were an invoice for services rendered or merchandise purchased. The loose handling of stamps can cast suspicion on any treasurer.

As mentioned above, the treasurer's report is the key to the entire system and is compiled for two purposes. Not only is it necessary as a record of transactions, but it is also a means of communicating information to the board meeting or to a meeting of the membership of the association. The usual order of business provides that the secretary read the minutes of the previous meeting. These minutes should refer to the previous treasurer's report and contain the cash balance included in that report. This then becomes the beginning of the new treasurer's report. He should begin by reporting the balance on hand from the previous treasurer (which should agree with the secretary's minutes). The next portion of the report should provide a listing of receipts by type and a total of those receipts. The third portion of the report provides a listing of the expenditures. This information is compiled for the report by a review of the deposit records and the notations on the check stubs. It should not be necessary to refer to the original invoices in order to obtain this information. The fourth portion of the treasurer's report is the balance of cash on hand. This is the sum of the previous balance and the receipts minus the total expenditures. A fifth portion of the treasurer's report should provide a list of unpaid bills, if any, so that the membership can forecast the changes in the cash balance in the near future. The treasurer's report should end with his signature.

A copy should be provided for the secretary to include in the minutes of the meeting. It is important, of course, for the treasurer's report to agree with the balance as shown on his checkbook and with the bank statement for the same period. A copy of the report, the bank statement, the deposit receipts, the paid bills, and the correspondence for the period can then be assembled and filed in a letter folder or envelope for future audit.

Handling the "Big Project"

Most associations have some sort of money-making activity from which funds can be obtained to be used for some service project. The typical big project might be a concert, dance, ox roast, carnival, or bingo party. Usually, this is handled by a separate committee but, in most cases, the treasurer becomes involved. A considerable amount of time and effort is sometimes expended to keep track of the transactions for a money-making scheme. Various people engaged in the project will need advances of funds in order to purchase decorations, buy prizes, make deposits for hall rental or possibly to have a change fund on hand. A treasurer should insist that proper authorization for each advance be obtained and should issue the advances by check. He must hold the committee member receiving this advance responsible for it and should obtain his signature on some document. At many of these events, there is a considerable amount of pressure on the treasurer to make cash settlements for expenditures. This should be refused to avoid suspicion, as well as to make sure of a proper record of the entire activity. The treasurer should insist upon receipts for sales. These can be classified according to the various departments of the project. In many cases, ticket accounting is grossly neglected. It is well to insist on pre-numbered tickets and for listing of the numbers assigned to each ticket seller.

The treasurer should be prepared to handle large amounts of coin and currency during the money-making project. In many cases, several thousands of dollars will be turned in within a few hours. This may consist primarily of bills of small denominations and heavy amounts of coins. It is possible to avoid the risk of loss by hold up through the very simple expedient of obtaining a short-term binder from an insurance company. A binder of this type costs from $5 to $10 and provides protection against loss due to robbery of amounts up to $10,000. This binder may be for a 24-hour period or may be for several days, depending upon the circumstances. It is a small cost to insure that the funds will be protected. Also, special police can be hired for a small sum in the event that the association finds this to be desirable. Arrangements should be made with the bank for night deposit of funds for the special projects so that the treasurer can dispose of the coin and currency rather than try to take them to his home for deposit on the next banking day. It is well to consider mechanical means for sorting and wrapping of coins. When faced with several thousands of dollars worth of coinage, the counting and wrapping activity can be of mountainous proportions. Arrangements should be made before-hand to borrow, rent or purchase coin handling equipment. Inexpensive sorting devices are available for this purpose.

A special financial report on the big project should be compiled. This should show an itemization of receipts and expenditures. It should also provide a profit and loss statement for each section of the project. This is especially true of carnival-type activities. It is often found, as a result of these profit and loss statements, that certain activities should be expanded and others curtailed. This information is then available for the committees handling the project in succeeding years. The net profit or loss from the big project should then be transferred to the regular treasurer's report as a single receipt or expenditure, depending upon the outcome of the project.

The Audit Committee

No treasurer should allow his association to accept his own word for the financial situation. He should insist upon an audit of his records at least once a year. This is usually handled by having the board appoint an audit committee. The function of this committee is to verify the accuracy of the treasurer's records, to provide a statement of the proper discharge of his duties, and to provide a declaration of the correctness of the cash balances. This committee should proceed by checking all receipts and disbursements since the previous audit, back to the original documents. They should make an entry in the checkbook indicating the point at which their audit ended and including a statement as to its correctness. In addition, the audit committee should provide a report to the board of directors indicating the extent of the audit and the results.

Expansion of Basic System

In the event that the basic system is inadequate for the purposes of the association, it is necessary to establish formal books of records. These are needed when there are too many classifications of transactions to be entered in the regular treasurer's report. They are also needed when cumulative totals by type of expenditure or by account are necessary for adequate records. An arbitrary rule might be to insist on formal books of record when the transactions exceed thirty individual disbursements a month. Even though the number of transactions may not exceed this number, formal books of record will be necessary in the event that the association owns assets other than cash or incurs liabilities which will be paid over a long term. The basic types of records include journals for general use, cash receipt books and cash disbursement books. In addition, a general ledger to provide a recapitulation by account classification will be required. With this set of books, the majority of transactions will be recorded either in the cash receipt book or the cash disbursement book. These transactions will

then be posted to the ledger record and a trial balance compiled. A treasurer's report is developed from this trial balance. The design of the cash books and the classification of accounts in the ledger should be the result of an analysis made by someone experienced in accounting. In many cases, the uninitiated will set up records that are either too complex or insufficiently detailed for the job. The experience of a practicing accountant can be most helpful in this case.

An accounts receivable ledger is generally required when the billings of the association to its members will vary. This may be because of different classes of memberships or because members are able to charge services or merchandise to their accounts. A typical example of this might be a swimming club association which presents its members with bills for dues, guest fees, swimming lessons, and admission to special events. The basic record can be either in the form of a card, a ledger sheet, or a file folder. Again, it is well to seek the services of an experienced accountant on the most appropriate system to cover the situation involved. The bookkeeping techniques that will save a considerable amount of posting and writing should be explored thoroughly to eliminate as much detail work as possible in the handling of accounts receivable.

Whenever one or more employees are performing services for pay for an association, a considerable amount of record-keeping becomes necessary. Problems of handling withholding taxes, complying with the wage and hour law, making the proper deduction for the Federal insurance contributions act, and reporting for state unemployment compensation must be taken into consideration. Payments to the Internal Revenue Service for wages withheld have to be made quarterly. In the event that withholdings exceed $100 per month, the payments must be made monthly. W-2 forms are to be submitted to the employee and the Government within thirty days following the termination of an employee. In addition, annual tax returns have to be filed. Here again attention is called to the existence of these problems in order to stress the need for accounting advice in the event that the treasurer has had no previous experience with situations of this type.

Addition of Budgetary Control

Even the smallest associations should operate on the basis of a planned financial program. Maximum amounts should be established for each type of expenditure. The total of this plan is called a budget. This must be incorporated into the financial records. In using the basic system without formal books of record, the treasurer's report is provided with separate columns. The actual receipts and expenditures are entered in one column and the budgeted receipts

and expenditures are listed in a parallel column. With the formal books of record, the easiest way of maintaining budgetary control is to enter the budget figures for each account as memorandum items in the ledger. For the most sophisticated organizations only will it be necessary for a separate budget accounting system of the type referred to as appropriation accounting. It is the function of the treasurer to report the comparison of actual to budget and to forecast unusual changes which may take place in the future. This forecast is part of the treasurer's report in larger associations.

Aids and Pitfalls

The common tendency of the association treasurer is to become too detailed in his recording of the transactions. As a result, he outlines for himself a considerable amount of unnecessary work and then, as time progresses, finds the burden of his job interfering with his leisure activities. It should be remembered that, in the majority of cases, the treasurer's job is a voluntary one and his only compensation is the criticism of the membership. It should also be remembered that it is poor taste for the treasurer to criticize his predecessor. Only in the event of defalcation should the treasurer report on the activities of his predecessor. As has been stated several times above, it is highly desirable for the treasurer who is not a practicing accountant to obtain the help of an accountant whenever it is necessary to expand the basic system or to revise or to reclassify a system of accounts. It is important to the profession of accountants that each representative should be regarded in a favorable light by the persons with whom he comes in contact. As the treasurer of an association, the accountant has the opportunity to provide a service of great value. He can do this best by presenting neat, clear reports at the regular meetings and making sure that he has them compiled on time.

Beyond these Covers

Books

Accounting Systems in Modern Business

Eldred A. Johnson, McGraw-Hill Book Co., 330 West 42nd Street, New York 36, N. Y., 1959, 453 pp., $7.75.

Topically arranged by types of accounting systems including manual, "write-it-once," mechanical, needle sort, punched cards, and electric systems, this book also treats system needs in relationship to organization in business. There is an appendix on forms design.

Managerial Accounting

Harold Bierman, Jr., Macmillan Co., 60 Fifth Avenue, New York 11, N. Y., 1959, 475 pp., $10.

The two sections into which this new text is divided—financial and managerial accounting—close with chapters on, respectively, "preparation of the funds statement" and "common dollar accounting." These implied emphases upon usefulness of accounting information are confirmed by attention to direct costing, differential costs, and break-even analysis.

Accounting—A Management Approach

Thomas M. Hill and Myron J. Gordon, Richard D. Irwin, Inc., Homewood, Ill., Revised Edition, 1959, 543 pp., $8.40.

Designed "primarily for the nonaccountant," this volume, successor to the 1951 text by Robnett, Hill and Beckett, is developed strongly in the direction of "managerial uses of accounting data for planning and control." Its arrangement gives progressive attention to method, income (and capital) measurement, and such internal application as standard costs, data for decision-making and budgeting.

Office Clerical Productivity Standards

Chicago Chapter, Systems and Procedures Association of America, Lock Box H, Chicago 90, Illinois, Paper Bound, 1959, $5.

Largely consisting of time data on clerical operations—e.g. "cut check amount in body of check," "remove two carbon sheets from unpadded three-part form"—this report may be of assistance to companies looking in the direction of such standards. However, caution is specified and it is suggested that all figures be regarded as "rules of thumb" and used for "general reference *only*." Preceding the data is a list of companies which contribute standards data and also a description of the survey which collected them.

Lease Or Buy

Foundation for Management Research, 121 West Adams Street, Chicago, Ill., 1958, Paper Bound, 13 pp.

This is a pamphlet which sets off leasing in turn, against "outright purchase," "installment purchase" and "bank loan purchase," with emphasis on "capital freed by leasing." It is well illustrated with charts and tables.

Measurement and Evaluation of Organizational Performance

Paul Wasserman, Graduate School of Business and Public Administration, Cornell University, Ithaca, N. Y., 1959, Paper Bound, 110 pp.

This listing of source material in an area of considerable interest to the accountant is annotated as to each title. It includes books and articles. Some special interest to accountants may attach to group III which begins with a section of listings on accounting and finance.